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NEW MILL CONSTRUCTION.

Volume XIV. Number 1. JANUARY, 1898. $2.00 Per Year, Including Directory. 20 Cents per Copy.

JAN 27 1898 Permodical Div.

TEXTILE WORLD.

TWO COPIES RECEIVED

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With which is Incorporated the

INDUSTRIAL RECORD

The Textile World's Complete Directory of Textile Establishments, the Mill Trade and of Large Buyers of Textile Fabrics, is presented to every paid-up subscriber. 360 pages, with 19 textile maps.

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GUILD & LORD, Publishers 620 Atlantic Avenue, Boston, Mass.

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GRANGER FOUNDRY & MACHINE CO.,

PROVIDENCE, R. I.

Bleaching, Dyeing, Drying and Finishing Machinery.

Cotton, Paper and Husk Rolls.

22727

TENTERING MACHINES

With Patent Self-Feeding Clips.

Patent Combination Rolls

OF

HUSK AND COTTON.

Calenders, Mangles, Drying Machines, Tentering Machines, Hydraulic Presses, Etc.

—BEETLES—

Short and Long Chain Dyeing, Sizing and Drying Machines.

PATENT

OIL, COMBINED "PLATE and FLAME"

SINGEING MACHINES.

K.T.J Oct. 31-08

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H. W. Butterworth & Sons Co.,

PHILADELPHIA, - PA.

BLEACHING, PRINTING, DYEING AND FINISHING

MACHINERY.

Tentering Machines

VIBRATORY

STRAIGHT

RETURN

— FOR ALL KINDS OF —

TEXTILE FABRICS.

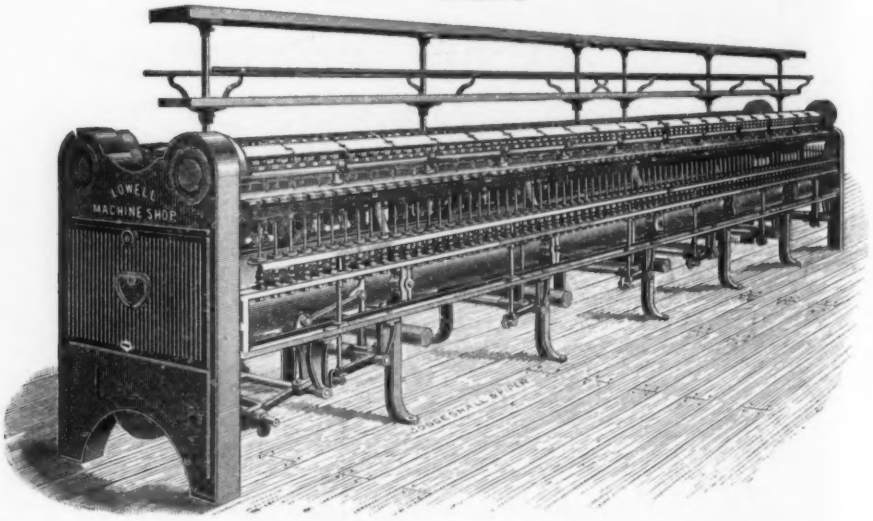
Patent Automatic Clamp, Spring Clamp, Pin Chain.

SPECIAL.

Tentering Machines with Adjustable Eccentric (Patent applied for) for imparting vibrating motion.

The above gives a uniformly smooth motion and the finish obtained on goods is of a superior character.

THE LOWELL RING FRAME.



All parts are made on special tools to standard sizes and are interchangeable.

The greatest care is taken to have the frames constructed so as to obtain the greatest production with the highest speed.

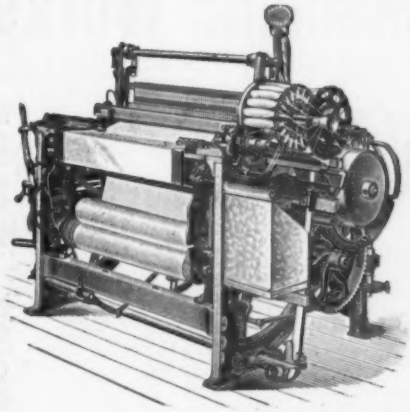
All spindles are run in their bearings before being sent out.

Fluted Rolls are ground to accuracy as to their roundness and diameter, a very important characteristic for high speed.

We supply the best Separator in the market and provide all our frames with traveller clearers, lifting thread board device, cut gearing, improved roving traverse motion, heavy tin drums that don't break down, and all other parts that go with a first-class machine.

Lowell Machine Shop,

LOWELL, MASS.



Consideration

OF THE

Northrop . . Loom

Involves comparison with former similar innovations.

It is more expensive — yes, and so is the plain power loom more costly than the hand loom which it displaced.

Why not return to hand looms and get a cheap equipment also giving more laborers employment? The conservative should be more consistent.

Why do mills that have adopted our High Speed Spindles hesitate about using this loom? It will save them more than the entire cost of the spinning on which our spindles only gained a fraction.

If Revolving Flat Cards can be introduced in spite of their greater cost, our looms should follow or preceed them. We can show more profit to the user than the entire cost of Carding, including Drawing and Roving Machinery, with the Picker Room thrown in.

THESE ASSERTIONS ARE CAPABLE OF PROOF FROM THE RECORDS OF 20,000 LOOMS.

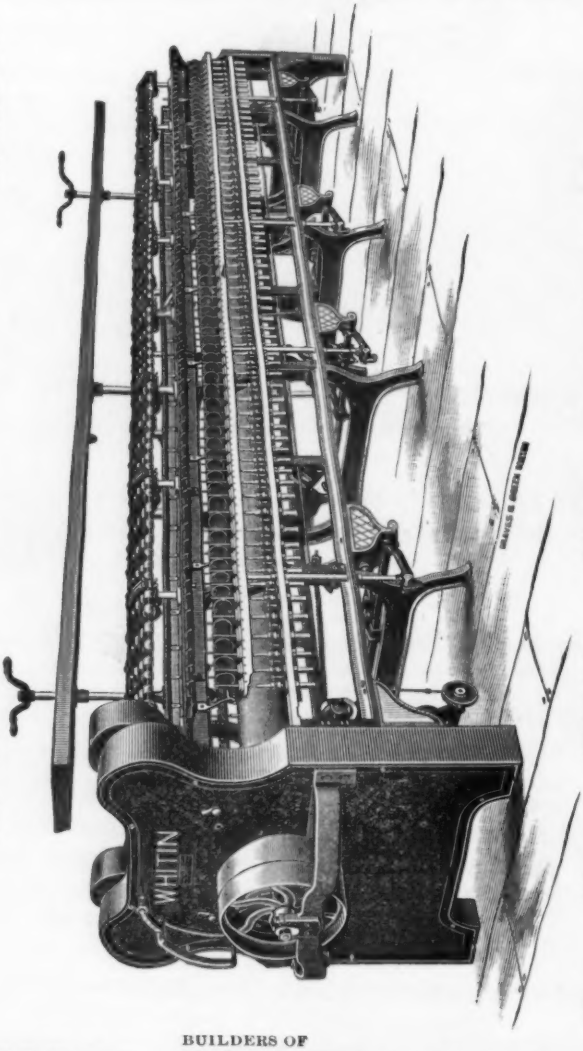
Draper Company,

HOPEDALE, MASS.

The Whitin Machine Works,

Revolving Flat Carding Engines,
Long Chain Quilling Machines,
Wet and Dry Twisters,
Looms,

Railway Heads,
Drawing Frames,
Reels,
Spoolers.



The New Whitin Ring Spinning Frame.

BUILDERS OF

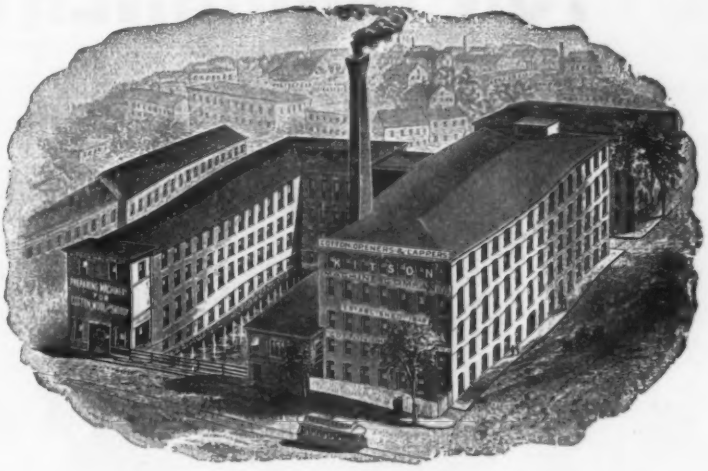
COTTON MACHINERY,

Whitinsville, Mass.

Southern Office: 38 So. Tryon St., Charlotte, N. C.
S. W. CRAMER, Southern Agent.

"Just as Good,"

Won't Do!



Kitson Pickers

are always the

STANDARD FOR COMPARISON.

New Catalogue for 1897 to be had on application to

KITSON MACHINE CO.,
Lowell, Mass.

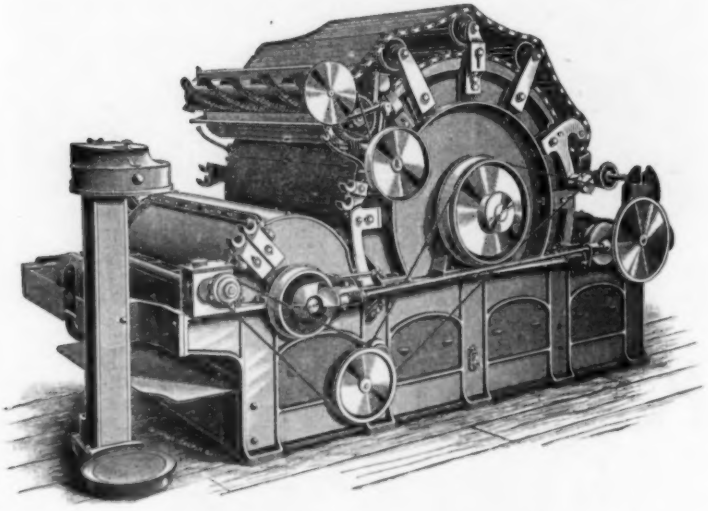
STUART W. CRAMER, Southern Agent,
Charlotte, N. C.

MASON MACHINE WORKS,

TAUNTON, MASS.

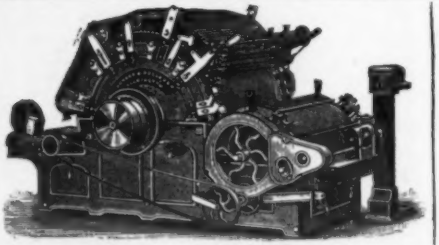
COTTON MACHINERY

NEW REVOLVING FLAT CARD.



Cards, Railway Heads,
Drawing Frames,
Spinning Frames,
Mules and Looms.

The Celebrated FALL RIVER IRON WORKS CO., one of the largest cotton mill plants in the world, is entirely equipped with our spinning and weaving. It has 262,416 SPINDLES of our PATENT SPINNING FRAMES and 7,469 of our LOOMS.



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American Machine Company,

(LIMITED),

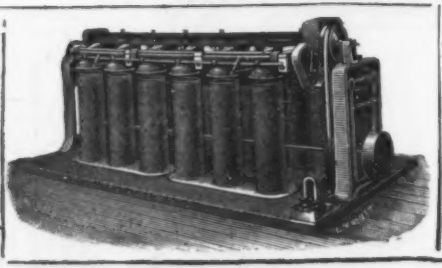
PAWTUCKET, - R. I.

Revolving Flat Cards.

The Simplest and Most Accurate. Greatest Production. Best Quality. Least Waste.

Electric Stop-Motion Drawing.

The quality of the sliver produced cannot be surpassed. Waste, "single" and roller laps are prevented, production increased, and great saving effected.



Bale Breakers, Feeders, Combined Self-Feeding Openers, Breaker and Finisher Lappers,

All made from entirely new patterns and containing many valuable patented improvements.

Slubbing, Intermediate, and Roving Machines.

New patented Differential motion, New Arrangement of Cone Drums, New System of Balancing top or bobbin rail, etc.

All parts of above machines are made by special tools and are exact duplicates.

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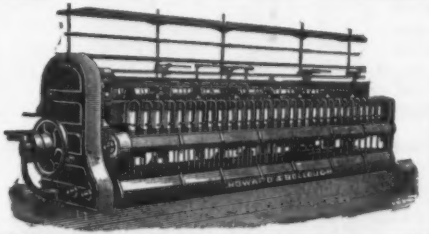


THE FISHER CARD FEED

for WOOL, SHODDY, and COTTON," is

Second to None

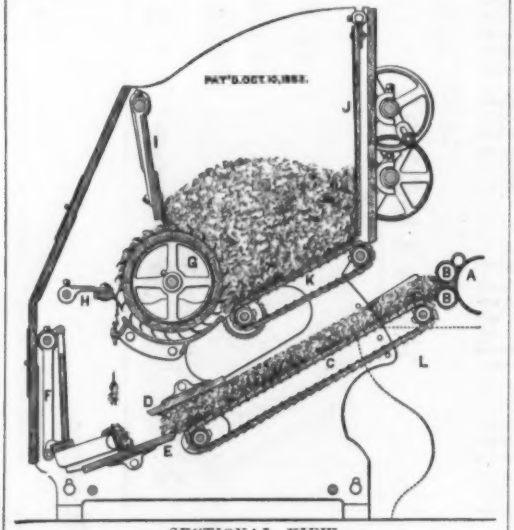
on the market. It holds more stock, requires less space, and needs no "attachments."

WOONSOCKET WORSTED MILLS,
Spinners of Worsted Yarns. Mixes and Fast Colors Specialties.
Boston Office, 570 Atlantic Avenue.

WOONSOCKET, R. I., March 4, 1896.

Messrs. Woonsocket Machine and Press Co., City,

GENTLEMEN—In answer to your inquiry of to day as to how we like the FISHER FEEDS would say that, after running one for three months and having put in four more since, is sufficient evidence that we consider the Fisher Feeds the best in the market to-day, and you are at liberty to bring any interested person into our mill to see them running and judge for themselves. Yours truly, WOONSOCKET WORSTED MILLS,
EDWIN FARNELL, Agent.



SECTIONAL VIEW.

THE FISHER CARD FEED is simple in construction, is strongly built, turns out even work, requires little changing, and feeds the same whether full or nearly empty.
It is built in all sizes and guaranteed as represented.

STAR WORSTED COMPANY,
Worsted Yarns.
C. T. Crocker, Pres. C. B. Smith, Treas.

FITCHBURG, MASS., March 4, 1896.

Woonsocket Machine and Press Co.,

GENTLEMEN—We have the pleasure to inform you that the two FISHER CARD FEEDS are working to our entire satisfaction, giving good results on both long and short wools.
Yours respectfully, STAR WORSTED COMPANY,
(Second order.) A. GARTH, Supt.

MANUFACTURED BY

Woonsocket Machine and Press Co.,

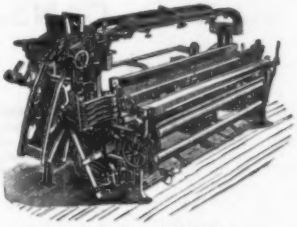
WOONSOCKET, R. I.

CROMPTON & KNOWLES

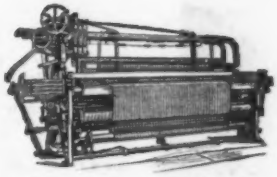
Loom Works,

Builders of every variety of

WEAVING MACHINE,

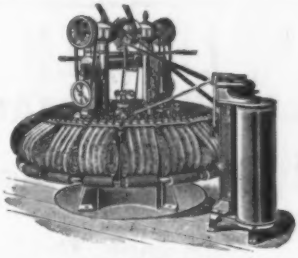


Crompton "1896" Woolen and Worsted Loom.



Knowles Heavy Worsted Loom.

Wool



Combs

Crompton-Noble Comb.

For Combing

COARSE
MEDIUM
FINE

WOOLS.

CROMPTON & KNOWLES LOOM WORKS,

WORCESTER, MASS., U. S. A,

FAIRMOUNT MACHINE CO.

22ND & WOOD STS.
PHILADELPHIA.

THE LATEST AND BEST LOOMS AND HARNESS MOTIONS

BEAMING, SPOOLING, WINDING, DYEING AND SIZING MACHINERY

POWER TRANSMITTING MACHINERY.

JAMES HILL MF'G. CO.,

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Manufacturers of ROVING CANS.

THE VULCAN CAN.

BODY—Vulcanized Fibre. **SIDE SEAM**—Riveted with Patent Clinched Rivets. **RINGS**—Tinned Steel, Brazed Joints, Curled Edges. **BOTTOM**—IXXX. Tin Star Corrugation: Fastened without the use of nails or screws, will not crack, warp or shrink and cannot come out. **FINISH**—Coated inside and out with moisture proof coating, handsome and smooth. **WEIGHT**—About one half pound per inch diameter. **SIZE**—All cans to an exact size, perfectly round and true. **DURABILITY**—Superior to any other Can.

Also Manufacturers of Hill's Improved IXXX Tin and Galvanized Iron Roving Cans.

KILBURN, LINCOLN & CO.,

FALL RIVER, MASS.

Makers of **LOOMS** for Plain and Fancy Weaving.

Also Shafting, Hangers, Pulleys and other appurtenances for the TRANSMISSION OF POWER.

Cohoes Foundry and Machine Co.

BUILDERS OF

SLASHERS,

ELEVATORS,

WATER WHEEL COVERNORS, SHELL ROLLS.

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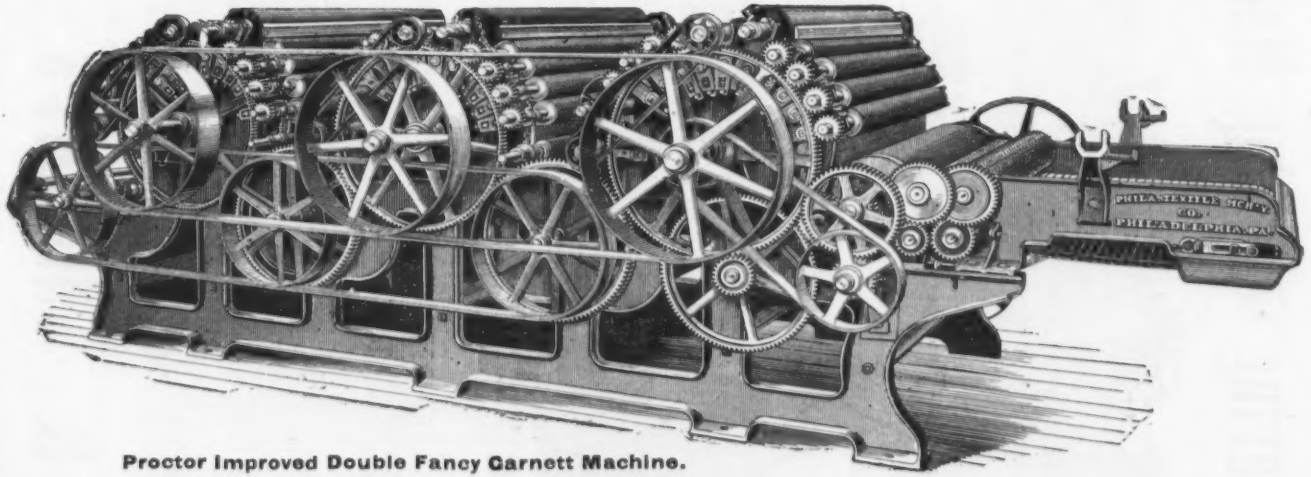
COHOES, NEW YORK.

GARNETT MACHINES

BREASTS, BURRING MACHINES,
FEED ROLLS, LICKERS-IN. : . .



Proctor Improved Double Fancy Garnett Machine.

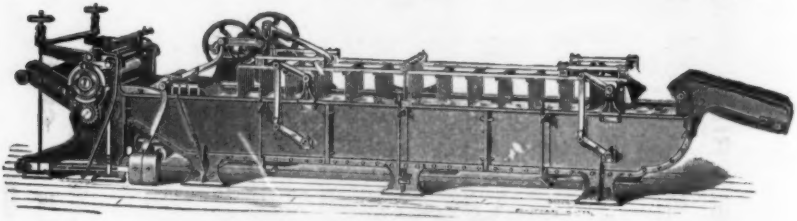
CYCLONE DRYERS

WOOL
COTTON STOCK
YARN
UNDERWEAR
HOSIERY

PHILADELPHIA
TEXTILE MACHINERY CO.,
Hancock and Somerset Sts., PHILA., PA.

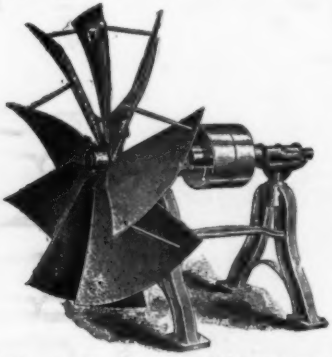
WOOL WASHING,

Preparing & Drying Machinery.

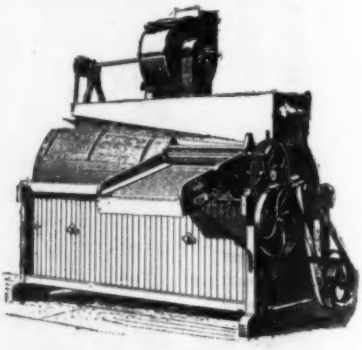


NEW PARALLEL RAKE WOOL WASHER.

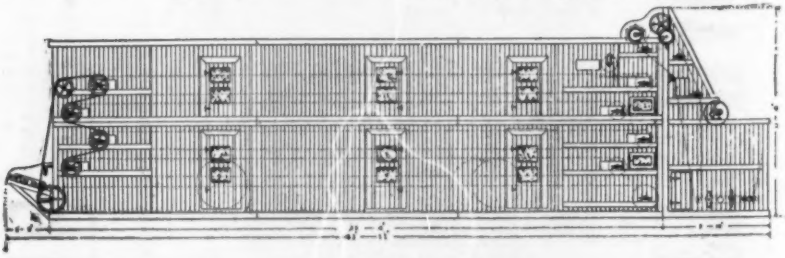
In addition to the above, we are the only builders of Four Rake and Hydraulic Washers. We guarantee our machines to be the Lightest Running and to require the Least Repair of any on the market. Production and results are second to none.



$33.00. Best and lowest priced Blower or Suction Fan on the market.



IMPROVED CONE DUSTER.
Exterior View Right-Hand Machine with Fan.



FIVE APRON WOOL DRYER.

We also Manufacture Multiple and Single Apron Dryers, Burr Pickers, Mixing Pickers, Crabbers, Self-feeders for Cotton and Wool; Breasts and Burr Machines for Cards. Wire Cylinders of all kinds repaired and Lickers in for Cotton Cards a specialty.

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Graniteville, Mass.

WORSTED MACHINERY.

STODDARD, HASERICK, RICHARDS & CO.,

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WE MAKE Duck, Ticking and Leather Lug Straps of all kinds. We carry in stock all ordinary sizes and make to order any special size or pattern. We furnish straps with the ends slotted, or fitted with 1, 2, or 3 holes, and with the leather (in the duck and ticking) either cemented or riveted.

For Woolen looms we have a tough, somewhat flexible, strap made of two or three thicknesses sewed, which gives better satisfaction on these looms than any other strap we know of.

PICKER LOOPS

WE MAKE Tape Picker Loops in all sizes, and carry in stock loops from 1 5-8 inches to 2 inches long. We make them either 6 or 7 ply. Our loops are as good as the best material and the most careful workmanship can make them.

Our deliveries are prompt and our prices reasonable.

We also make Raw Hide and Leather Loom Pickers, Loom Harnesses and Reeds, Black Oak Tanned English Picker Leather, and North Carolina Hickory Picker Sticks.

LOOM PICKER CO.,

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PLATT BROS. & CO.'S
REVOLVING FLAT CARDING ENGINES,

"1894" pattern with Patent Flexible Bend with slots for direct setting of the flats to the cylinder by the gauge, and McConnell & Higginson's Patent Grinding Apparatus for grinding the flats from their working surfaces.

Sykes' Hardened and Tempered Plow Ground Polished Steel Wire Card Clothing.

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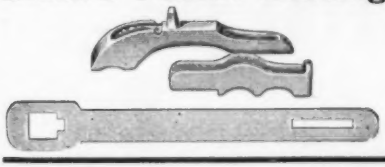
Sole Manufacturers of

Dixon's Patent Locking Saddles and Stirrups.



The weight can be taken off and put on to the middle rolls, without stopping your frames, when long staple cotton is used.

The Stirrup is always in place.
No bent stirrup resting on rolls

Manufacturers of all kinds of **Saddles, Stirrups and Levers.** Send for Samples and Prices.

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Glutrose Sizing will effect a saving of 25% to 30% of flour or starch.

Glutrose Sizing will penetrate the goods better, go farther and finish better than anything else, adding much to the strength, stiffness and lustre of the goods.

Glutrose Sizing has no offensive odor, and goods prepared with it will retain their condition better under severe climatic changes.

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The most Marvelous Lubricant Known.
Used Dry, or Mixed with Water, Oil or Grease.

NOT AFFECTED BY HEAT, COLD, STEAM OR ACIDS.

An Interesting and Instructive Pamphlet will be sent Free of Charge.

JOS. DIXON CRUCIBLE CO. Jersey City, N. J.

TEXTILE DESIGN

TAUGHT BY CORRESPONDENCE.

Send for Prospectus.

GAVEY CORRESPONDENCE SCHOOL OF TEXTILE DESIGN,

P. O. Box 222. Brooklyn, N. Y.

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Entire Outfits for New Mills, or small and odd items that you don't know just where to obtain, can be found at the

AMERICAN SUPPLY CO.
PROVIDENCE, R. I.

in Mill Supplies.

JACOB WALDER, - Paterson, N. J.
Sole Manufacturer in United States of
BRASS AND STEEL MAILS
Liberal Discount to Dealers.

STANDARD MILL SUPPLY CO.,
Manufacturers and Dealers in
General Mill Supplies,
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ESTABLISHED 1873.
WHITINSVILLE, MASS. U.S.A.
OUR PATENTED SPECIALTIES.
DOUBLE RIBBED RINGS U.S. STANDARD TRAVELER CLEARERS. METALIC BURNISH LIKE THAT PRODUCED BY THE TRAVELER.

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Somerville, Mass.
Mill Sewing Machines.

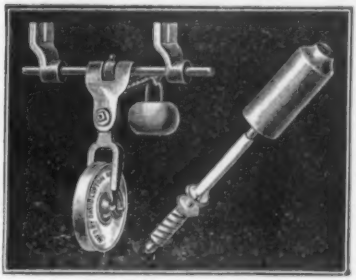
Sews any fabric, wet or dry, thin or thick, fine stitch or coarse stitch.

SEND FOR CATALOGUE.

Bleaching, Dyeing and Finishing Machinery.

The Dinsmore Manufacturing Co.
CHAS. F. CURWIN, Treas., SALEM, MASS.
Factory Sewing Machines and Supplies.

Special Machines for Cotton Mills, Woolen Mills, Print Works, Bleacheries, etc.
Wilcox & Gibbs' Supplies.
Loopers, Needles, Threads, etc.



Mill Supplies.

OUR SPECIALTIES:

Spinning Tubes,
Caps (Steel or Iron)
Spindles,
Tension Pulleys, Etc.

Quality and workmanship guaranteed

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Makers of the Bamford & Smith Self-lubricating Spinning Tube.

GEORGE FELL & SON,

BOLTON, ENGLAND.

Manufacturers of
Persian, Welsh and Calf **ROLLER SKINS.**

ELIJAH ASHWORTH,

MANUFACTURER OF

Card Clothing of Every Description

FALL RIVER, MASS. **HENRY ASHWORTH, Agent.**

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WIRE HEDDLES.
TEMPERED STEEL WIRE
STRIPPER CARDS.

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ELLIOT CLOTH FOLDER AND MEASURER

For Cotton and Gingham Mills, Bleacheries, Print Works, Etc.

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Established 1869. **JOHN WHITAKER REED CO.,** Successors to John Whitaker

MANUFACTURERS OF

LOOM REEDS

OF EVERY DESCRIPTION,

For Cotton, Woolen, Carpet, and Wire Cloth Mills. 104½ Front St., WORCESTER, MASS.

JOHN McINTOSH, Proprietor.

THOMAS TOWNSEND,

Rhode Island Comb Works, Mfr. of

Machine Wool Combs, Cotton Combs Neatly Re-Needled

Hackles, Gills, Fallers and Porcupines. Tentering Tin Plates. Dealer in the best English and American Cast Steel Pins and Comber Needles.

All Work Guaranteed. 157 Orange St., Providence, R. I.

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GET AN AMERICAN EXPRESS MONEY ORDER.

RATES LOWER AND SYSTEM SAFER THAN ANY OTHER METHOD.

DO NOT CARRY MONEY WHEN TRAVELING.

IT IS ENTIRELY UNNECESSARY IF YOU TAKE

THE **TRAVELERS CHEQUES**

OF THE **AMERICAN EXPRESS COMPANY.**

COMB CIRCLES
Fallers and Gills.
and all kinds of GILL COMB and CARD PINS, and PICKER TEETH.
PRICES REDUCED.
WILLIAM CRABB & CO., Newark, N. J.

Established 1844.
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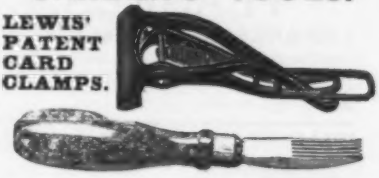

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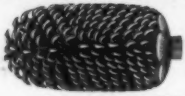
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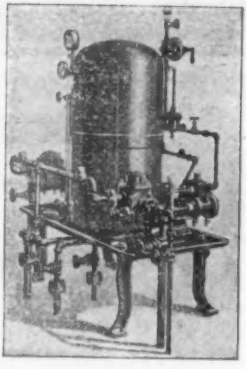
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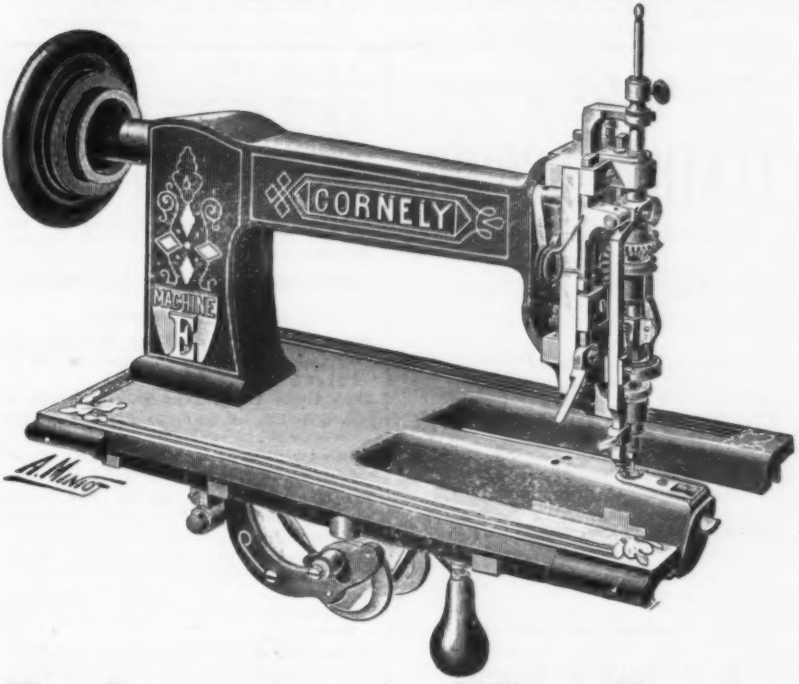

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(Continued from page 26.)

Dye, Anthrarufin. 595,349. R. E. Schmidt, assignor to Farbenfabriken, vormals Fr. Bayer & Co., Elberfeld, Gy.

Dye from Chrysazin Blue. 595,350. R. E. Schmidt, assignor to Farbenfabriken, vormals Fr. Bayer & Co., Elberfeld, Gy.

Gin-saw Sharpening Machine. 595,520. J. M. Bradley, Hillside, Tex.

Knitting Machine. 595,439. H. A. Houseman, Philadelphia, Pa., assignor to Standard Machine Co., of Pennsylvania.

Knitting Machine Heel-hook. 595,365. A. Boehmen, Rockford, Ill.

Loom. 595,417. P. C. Stadler, Paterson, N. J., assignor to Wm. Strange Co., of New Jersey.

Loom for Lappet-weaving. 595,677. S. A. Leavens, J. M. Harvey and W. A. Chandler; said Chandler assignor to A. G. Kempton, Grafton, Mass.

Loom-reed. 595,596. E. M. Bergner, Paris, France.

Loom-shuttle. 595,416. J. C. Sergeson, Philadelphia.

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—A simple twill is one in which the threads form a series of furrows or ribs crossing the texture in a diagonal form without any additional ornamentation.

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Specifications and drawings furnished for ten cents each. Address W. S. Gavey, P. O. Box 222, Brooklyn, N. Y.

Cotton Chopper. 593,808. F. L. Richter, Moravia, Texas.

Cotton Picking Machine. 593,707. W. A. Turner, assignor to Chicago Picker Co., Chicago, Ill.

Drawing-rolls of Cotton Machinery. Rotary clearer for. 593,971. J. Thomson, Jr., Pawtucket, assignor to Thomson Mfg. Co., Providence, R. I.

Drawing-rolls of Cotton Machinery. Rotary clearer for. 593,972. J. Thomson, Jr., Pawtucket, assignor to Thomson Mfg. Co., Providence, R. I.

Drawing-rolls of Cotton Machinery. Rotary clearer for. 593,973. J. Thomson, Jr., Pawtucket, assignor to Thomson Mfg. Co., Providence, R. I.

Dye, Blue-black Diazo. 593,790. M. Ulrich and J. Bammann, assignors to Farbenfabriken, vormals Fr. Bayer & Co., Elberfeld, Gy.

Fabrics. 593,883. Manufacture of Mixed or Partly Colored. H. Giesler, Molsheim, Gy.

Knitting Machine. Circular. 593,663. L. C. Huse, Laconia, N. H.

Loom Pile Fabric. 593,957. C. H. Burt, Warren, Mass., assignor to Butworth Carpet Co., Springfield, Mass.

Loom-shuttle Operating Mechanism. Power. 593,941. E. Huschke, Saalfeld, Gy.

Spinning, Doubling and Twisting Machine, combined. 593,886. C. C. E. Van Alstine and G. W. Graham, Patersen, N. J.

Underclothing. Combined woolen and linen. 593,772. F. Linneborn, Hagen, Gy.

Cotton Compressor. 594,125. A. T. Snodgrass, Dothen, Ala.

Dye, Blue-red Tetrazo. 594,123. C. H. Rudolph and J. Herbabny, assignors to firm of K. Oehler, Offenbach-on-the-Main, Gy.

Dye, Mixed Sulfur. 594,106. H. R. Vidal, Paris, France.

Dye, Sulfur. 594,105. H. R. Vidal, Paris, France.

Dye, Thiazin. 594,107. H. R. Vidal, Paris, France.

Knitted Fabric. 594,158. S. D. Keene, assignor, by mesne assignments, to S. Bottomley, Providence, R. I.

Knitting Machine. 594,353 F. H. Moon, Hyde Park, assignor to C. F. Murphy, Boston, Mass.

Knitting Machine. Circular. 594,082. E. R. Branson, Philadelphia, and F. E. Davis, Rockford, Ill., assignors to said Branson.

Loom Shuttle-guard. 594,038. L. Sconfietti, Legnano, Italy.

Loom Warp Stop-motion. 594,341. M. J. Bigelow, Hopedale, Mass., assignor to Northrop Loom Co., Hopedale, Mass., and Saco, Me.

Loom Warp Stop-motion. 594,344. W. F. Draper, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass., and Portland, Me.

Loom Warp Stop-motion. 594,355. J. H. Northrop, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

Loom Warp Stop-motion. 594,213. O. Piper, Manchester, N. H., assignor, by mesne assignments, to Northrop Loom Co., Saco., Me., and Hopedale, Mass.

Spindle and Bearing. 594,118. J. S. Moody, Saco, Me.

Spindle and Twisting Frame, Ring. 594,347. J. W. Foster, Westfield, assignor of one-half to M. M. Dunn, Boston, Mass.

Spool for Containing Thread. 594,190. B. L. Armstrong, New London, Ct.

Wool-bagging Machine. 594,321 J. Brandy, Trinidad, assignor of three-fourths to G. M. Forbes, Las Animas Co., Col.

Cotton Picker. 594,481. A. S. Martin, Maiden, N. C.

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Embroidering Machine. 594,653. M. H. Rumpf, Paris, France.

Loom. 594,684. J. F. Dustin, assignor to himself and Parkhill Mfg. Co., Fitchburg Mass.

Loom Box-motion Operating Device. 594,685. J. F. Dustin, assignor to himself and Parkhill Mfg Co., Fitchburg, Mass.

Loom Picker-check. 594,719. R. W. Andrews, assignor to G P. Andrews, Stafford ville, Ct., and S. J. Chamberlin, Westerly, R. I.

Loom Shuttle. 594,402. A. Isherwood, New Bedford, Mass.

Loom Shuttle-box. 594,704. J. H. Northrop, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass., and Portland, Me.

Sheep-dip Compound. 594,753. J. A. Palethorpe, Liverpool, Eng., assignor to Tobacco Warehousing and Trading Co., Danville, Va.

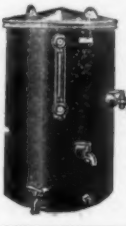
Sheep while being sheared, Support for. 594,428. T. A. Reynolds, Bunch, Ia.

Spinning Machines and Support Therefor. Thread-guide for. 594,581. E. Whittum, Fall River, Mass.

Loom. 595,198. J. H. Northrop and M. J. Bigelow, Hopedale, Mass., assignors to Draper Co., Hopedale, Mass., and Portland, Me.

Loom-picker. 595,226. F. A. Wardwell, Methuen, Mass.

Oil from Cotton-seed, etc. Roller press for extracting. 595,022. P. Lelardoux, Denison, Tex.



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Rug-making Machine. 595,118. O. Rice, E. Oakland, Cal.

Silk Worms. Obtaining useful products from. 594,888. A. Millar, Glasgow, Scotland.

Take-up Mechanism. 595,103. G. F. Hutchins and W. D. Thompson, assignors to Crompton & Knowles Loom Works, Worcester, Mass.

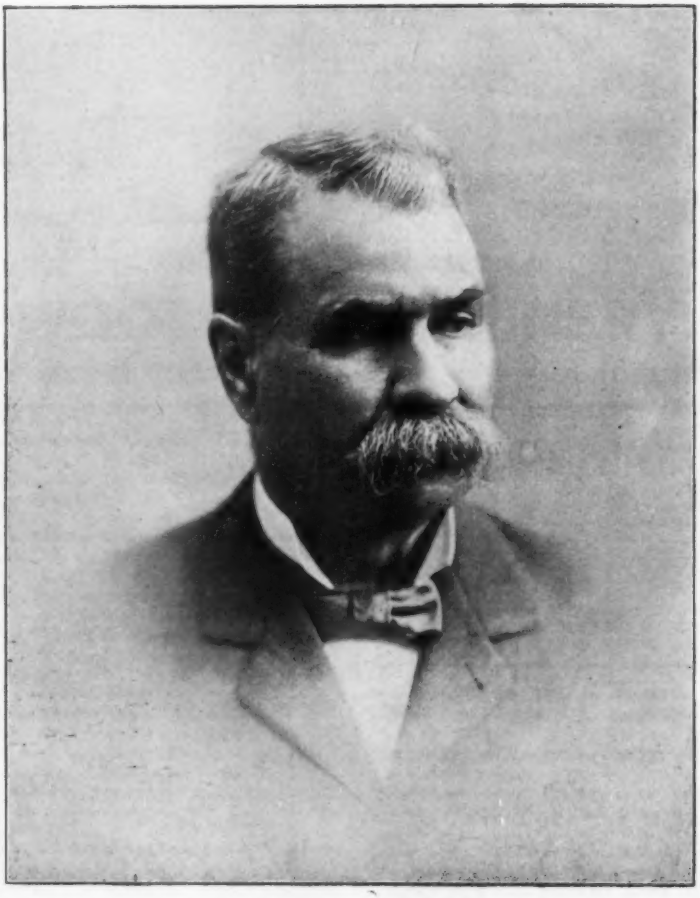
Take-up Mechanism. 595,104. G. F. Hutchins and W. D. Thompson, Worcester, Mass.

Cotton Chopper. 595,397. J. S. Lauderdale, Kellyton, Ala.

Cotton-stalk Puller. 595,456. J. Hall, Surrency, Ga.

Cotton-stalk Puller. 595,626. B. F. Harwood, Cooper, Texas.

(Continued on page 24.)



GEORGE W. BEAN.

TEXTILE WORLD.

Vol. XIV. JANUARY, 1898. No. 1.

GEORGE W. BEAN.

George W. Bean was born at Concord, N. H., in the year 1837. Having a desire to learn manufacturing he purchased, at the age of seventeen, his time of his father at five dollars per month and went to Manchester, N. H. On arriving there, his riches consisted of only forty-five cents in money with which he bought a pair of overalls. He at once commenced work, as watch-man, for the Amoskeag Manufacturing Company, where he remained two months. He then began to learn manufacturing at the Stark Manufacturing Company. After working there six months he decided that, in order to be a successful cotton manufacturer, he must first learn the machinist's trade. He left the mill and engaged work at the old Amoskeag corporation shop at fifty cents per day, for the first year, and sixty-seven cents per day, for the second year. When the Baldwin Locomotive Shop started up, he was engaged to work there on locomotives for one year, after which time he left the shop and went back to the Stark Manufacturing Company to take up manufacturing again, where he accepted the lowest place in the weave room, but in the course of time worked himself up to an overseer's position. In 1861, he left this company to take charge of the weaving department in the Androscoggin Mills, Lewiston, Maine. After the war broke out, the Androscoggin began to manufacture duck goods for the army, Mr. Bean weaving the first sample, and was the main pusher in the manufacturing of the goods.

In 1864, after the second draft for army service, the Lewiston Light Infantry were called to enforce the draft at Kingfield, Franklin County, Maine. Mr. Bean was one of the company and they left Lewiston, July 16th, with one hundred men, camped in Farmington over night, and on the 17th of July marched twenty-six miles to Kingfield with guns, knapsacks, and ten rounds of ammunition. They were met by the band about two miles from town, and escorted into Kingfield, where they notified each drafted man to appear at head quarters, Lewiston, for examination. They remained there three days. In about two weeks after they had returned to Lewiston, they were called to Fort McClary, Maine, to man the fort. Mr. Bean sent a substitute as he was needed at the mill.

In 1867, he left the Androscoggin Mills and went to Great Falls, N. H., as superintendent. After remaining there four years he became superintendent of the Merchants Mills, Fall River, Mass., where he was superintendent fifteen years. He was there during the great mule spinners' strike which lasted sixteen weeks. He employed the help to run the mules and boarded them in barracks in the mill yard. In 1886, he returned to Lewiston as agent of the Androscoggin Mills, where he still remains. He has increased the capacity of these mills, and made many improvements. Bag manufacturing was started by him at these mills, and he wove the first bag, over thirty-four years ago.

Mr. Bean has devoted his whole time to cotton manufacturing, has never taken an interest in politics, although he was at one time a member of the Lewiston City Council, but decided he could not be both a politician and manufacturer, so gave up the former altogether. He is a live and very active man, allows no grass to grow under his feet and wants every body around him to move.

Mr. Bean married Sophronia A. Cor-

liss, in 1858. He has one son, twenty years of age, now attending the Lowell Textile School, where he is learning manufacturing.

He believes in the Young Men's Christian Association, and has been one of the directors of the association for ten years, giving very liberally each year for its support. He is a constant attendant at church and gives freely to its support. He is not a believer of foreign mission work, but believes in looking after and helping the poor ones at home. He is not much of a society man, but is a great lover of sport and enjoys a good joke at all times.

The Androscoggin Mills, of which Mr. Bean is now agent, manufacture sheetings, shirtings, sateens, and grain bags. The capital stock is $1,000,000. There are 68,000 spindles, 1939 looms, eight turbine wheels, and two engines, one engine of 600 horse power and the other of 200 horse power. The larger of the two is run constantly. The goods manufactured at the Androscoggin Mills are sold by Bliss, Fabyan & Company, 100 Summer Street, Boston, Mass., 71 Thomas Street, New York, N. Y., and 408 Medina Building, Chicago, Ill.

Calendars for 1898.

We are in receipt of the following calandars for 1898:

A. G. VanNostrand, Charlestown, Mass., brewer of the well known Bunker Hill lager beer.

George P. Clark, Windsor Locks, Conn., manufacturer of hand and platform trucks, rubber wheels and casters, rubber squeeze rolls for dyeing and carbonizing, power wringers, exhaust fans for public buildings, factories and mines, warp dyeing and sizing machines. The calendar bears a half-tone illustration, entitled "A Happy Thief," showing a young negro having in his possession a watermelon.

Shultz Belting Co., A. E. Laurence, manager, 113 Liberty St., New York, manufacturers of all kinds of belting, raw hide, lace leather, etc. This calendar bears a colored lithograph of a fashionable young lady.

Burdett's College, Boston. Pupils of this institution receive instruction in actual business methods, short-hand, etc. They acquire an excellent business training, which is the seed of success. This college furnishes book keepers and stenographers.

India Alkali Works, Boston, Mass., well known as the manufacturers of Savogran, a cleansing powder which has given great satisfaction wherever used. It is used in the departments of the United States government, and was adopted by the World's Fair officials, in 1893.

Robert A. Keasbey, 54 Warren St., New York, representing the Keasbey & Mattison Co., manufacturers of magnesia sectional coverings for boilers, steam pipes, etc. This calendar is made attractive by an excellent half-tone picture, in colors, of strawberries.

William Corey Co., Manchester, N. H., manufacturers of knitting machinery, latch needles, etc. This is a particularly effective calendar, with a large etching of a peasant's dwelling.

We have received the thirteenth edition of the Columbia Desk Calendar, a most useful desk companion, which enlivens the daily memoranda of business notes with sprightly sayings and suggestions relative to the popular outdoor sport of which the Columbia bicycle affords the best means of employment. Copies of this very useful calendar may be obtained by sending five two cent stamps to the calendar department of the Pope Mfg. Co., Hartford, Ct.

The Mc Michael & Wildman Mfg. Co.

—There appears in this issue the advertisement of Mc Michael & Wildman Mfg. Co., Norristown, Pa., manufacturers of knitting machinery. This company has placed before knit-goods manufacturers, a machine that is highly spoken of wherever used, for all classes of ribbed hosiery and underwear, combination suits, sweaters, etc. Their automatic sleever and fancy hosiery machine, with chainless measuring attachment, is meeting with especial favor. The approximate length of the pattern is determined by stationary plates or segments on the measuring disc. We would suggest writing to the concern for their catalogue, which gives full particulars and description of the machines made by them. The company has opened a Boston office at 120 Kingston St., where a full line of their product can be seen in operation.

—The partnership existing between E. A. Hirner, A. F. Henninger and E. H. Jacobs, trading as the Excelsior Knitting Machine Manufacturing Co., Bo. Bethlehem, Pa., has been dissolved by mutual consent. Messrs. Hirner & Henninger will continue in the business under the name of the Excelsior Knitting Machine Manufacturing Co., and will remove to Allentown. The building at Allentown is situated on the corner of Washington and Meadow Sts., and is a one-story building, 260x50, with an addition 14x16 for engine room, and a boiler house 45x30.

—We stated in our August issue that the woolen manufacturers of this country had on hand from eight to nine months' supply of foreign and domestic wools. The facts now prove that we were then correct in our view of the situation, as manufacturers are already entering upon the market and making their purchases in anticipation of the exhaustion of their supplies by April next. Some mills are supplied with wool for a longer period, and much of the purchases made before the passage of the tariff act will be utilized by mixing with later purchases, to reduce the average cost of the raw material.

Textile World

WITH WHICH IS INCORPORATED THE

INDUSTRIAL RECORD,

COMBINING

THE AMERICAN TEXTILE, THE DESIGNER AND WEAVER, WARP AND WEFT, THE WOOLEN MANUFACTURER

AND THE

BOSTON TEXTILE.

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THE TEXTILE WORLD'S COMPLETE DIRECTORY OF THE TRADE.

(360 pages with 19 maps)

Containing full information about all

COTTON MILLS, WOOLEN MILLS, KNITTING MILLS, SILK MILLS, DYE WORKS, PRINT WORKS, BLEACHERIES,

also lists of

Dry Goods Commission Merchants,
Dealers in Raw Materials,
Manufacturing Clothiers,
Suit and Cloak Makers,
Jobbers and Large Retailers,
Buyers from First Hands.

Special quarterly issues are published in January, April, July and October; one (January) being a statistical issue, and the others devoted especially to the cotton, knitting and woolen branches, respectively.

WHY WERE WOOL VOTES WITHHELD?

It would be interesting to have an explanation of the reason why only two votes were cast upon the passage of the tariff act of 1897, in the House of Representatives, from the region where one-third of the sheep exist, viz., Montana, New Mexico, Utah, Wyoming, Colorado, Idaho, Arizona and Nevada, and these two votes (cast by Utah and Wyoming) were thrown against the bill. Representatives from Idaho, Montana, Nevada and Colorado were present, but did not vote. Why not? There were absent representatives from New Mexico and Arizona. Why were they absent? Then again, why did the representatives from Utah and Wyoming vote in the negative? And still further, why was not a single vote cast in the affirmative from this section of the country, which, as we have stated, is interested in the national sheep husbandry to the extent of one-third of the number of sheep? California, Oregon and Washington have one-sixth of the number of sheep in this country, and still the representatives of these States threw only five votes in the affirmative and four votes in the negative, on the passage of the act of 1897. The question is: "Did these votes represent the true sentiment of that section of the country concerning a duty on wool? Let us analyze the vote a little further. Take the group of States, Minnesota, Iowa, Missouri, Kansas, Nebraska, North and South Dakota, and we find that twenty-six votes from these States were cast in the affirmative, and thirteen in the negative, while ten were present and not voting, with one absent. What was the reason for these ten that were present withholding their votes?

The elections of 1896 were conducted upon two main issues, the free coinage of silver and the tariff, and it is supposed that the House of Representatives was made up of members representing their constituencies upon these two questions. It must be presumed that the House of Representatives properly represented the senti-

ments of the people on the tariff question, and when 205 members voted in the affirmative and 122 in the negative, on the passage of the tariff act, is it not reasonable to suppose that this was the proportional sentiment of the country upon this important question? In our February issue, these questions will be answered.

SKIRTED WOOL

Theodore Justice, a well known wool merchant of Philadelphia, in speaking of the skirted wool clause in the tariff, says, in regard to the duty on fleeces that have been skirted, "that if imported from Australia and South America, and skirted as they were in 1890, and prior thereto, and if such as have not had more than 10 per cent. of the original fleece removed, will be subject to the first class, single unwashed duty of 11c. per pound." We desire to call attention to the phraseology of the tariff "that skirted wool as imported in 1890, and prior thereto, are hereby excepted" from the payment of double duty, as provided for in the paragraph in which this clause appears. This permits the importation of Australian wools that have been skirted, to the extent of at least 30 per cent. of their weight, which, in many instances, was not exceptional prior to 1890. Since that time, the skirted proportion of the fleece has been less, leaving more of the body and surrounding portions to be included in the fleece, so that at the present time, the average weight of the skirts do not exceed 15 to 20 per cent. of the total weight of the fleece, leaving to the manufacturer, or importer, a margin of 15 per cent. at least, before coming within the penalty limit, affecting conditions prior to 1890.

NOT BUSINESS-LIKE.

Some of the cotton planters of South Carolina have recently held a meeting and passed resolutions against "gambling in cotton futures." We think that the cotton planters who passed such resolutions concerning dealings in future contracts knew very little what they were doing, by attempting to apply a remedy to a disease that does not exist to any detrimental extent. That there are speculations to the extent of gambling, in some instances, in the price of cotton, is admitted, but the general operations are conducted according to the rules of the cotton exchanges, as they all must be, and are, on the whole, beneficial, rather than otherwise, to the cotton planting interests.

In regard to the use of fertilizers in the production of a crop, there was much unbusiness-like sentiment expressed at this meeting, to the effect that planters should obtain their fertilizers upon what is termed "the cotton option" plan, based on 7-cent cotton, or refuse to buy them. The value of fertilizers cannot be measured by the price that cotton may bring per pound, but by the increased production that they will effect. It would be much better for planters to base their purchases of fertilizers upon the percentage of increase in their crop, rather than upon any particular price which the staple will bring in the market.

—It is hardly to be expected that textile machinery made in this country will be exported at once in competition with that made in Europe, but it would not be at all strange that something of this kind should take place at some future date, in harmony with what is being done in other lines of manufactured articles from iron, due, to a very large extent, to the ingenuity of American devices, with special reference to convenience. American manufactures have a respectable hold upon the markets abroad, as noted in the exports of bicycles, boots and shoes, soap making machinery, and that for the manufacture of India rubber, besides other conspicuous examples, as tramway electrical equipments and steel rails. Even England has found it to its advantage to come to this country for this latter product, as noted in the late purchase of the London Northwestern Railway Co., which has completed a negotiation for the delivery of one hundred thousand tons of steel rails. The superiority of United States products is admitted by

Europeans, in such articles as dental tools, engines, nails, screws, and even in pianos. This indicates a growing tendency toward the use of American tools and machinery.

COTTON MANUFACTURING SITUATION.

The cotton manufacturing industry, it may be said, is in a deplorable condition, at the present time, more especially that portion located in the Northern States. The Southern portion is not entirely free from the depression, still it does not exist there to, until there is a more satisfactory equilibrium established between the conditions existing at the North and and South. The most important and conspicuous expression of views of existing conditions, is the recent report of the Arkwright Club, Boston, in which great stress is placed upon Southern competition and the dangers existing in it for the New England cotton industry. The remedies suggested in this report are certain changes in the laws of the New England States, and more particularly in those of Massachusetts, and in a cut of wages. It is hardly to be expected

ARKWRIGHT CLUB'S REPORT—STATISTICS TABULATED.

	North.	South.	
Speeder Tenders, per week.....	$7.00 @ $9 50		58 hours.
" ".....		$3.90 @ $4 80	66 "
" ".....		$4.50	112 sp. slub tended at $4.50
" ".....		$4.80	136 sp. int. " " $4.80
" ".....		$5.90	204 sp. fine " " $5.90
" ".....	$35.84 @ $43.29		928 roving sp. 58 hours.
" ".....		$26.70	928 " " 66 hours, 6 hands.
Ring Spinners, per day, per side	10.9 c.		Warp, 96 spindles.
" " " "	14		Filling, " "
" " " "		8½ c.	Warp, " "
" " " "		9 c.	Filling, " "
" " " "		7c. @ 8c.	128 sp. per side.
Spoolers, per day.....		50 c	
Warpers, " "		50 c.	Tending 2 warpers.
Weavers, per 55 yards.....	25 c.	17½ c.	64x64, 38½" wide.
" 55 "	28 c.	20 c.	68x72, 39" "
" 62 "	25	17½ c.	64x60, 39" " {32 warp. {41 filling.
" 60 "	35	25 c.	68x72, 39" " 4.75 goods.
Common labor in mill, per day....		50 c. @ 75 c.	
Unskilled help, weekly.....		$2 50	
Skilled " "		$4.50	
Total cost of labor, per lb., cloth..	6 c.	4 c.	
Production of cloth, lb. per spindle		1.2	58 hours. Goods {38½" wide 64x64 {39" " 68x72
Coal, ton		$1.65 @ $3.40	
Bricks at the kiln, per 1000.....		$3.00 @ $4.00	
Hard-pine lumber, per 1000 ft.	$20 @ 21	$13	
Cost of mill building, per sq. foot		48 c. @ 54 c.	

to the same degree as at the North. The depression has not been so acute for a great many years; and so keenly is it felt that manufacturers throughout the New England States have felt compelled to reduce the cost of manufacture by cutting down the wages of their employees. The cause of this situation in the North is more directly attributable to Southern competition though all of it is not due to this. Other causes of a more remote, but no less potent, nature are acting their parts. The cutting down of wages is a doubtful measure of permanent relief, though it appears to be the only immediate remedy that can be resorted that any legislature will approve of any change in the laws that now exist upon the statute books. The only alternative, therefore, is to reduce the wages of employees. The objections to the laws are not so much against their equity, in themselves considered, as in the fact that those of all manufacturing States are not alike, to the disadvantage of the industries of some of the States.

Southern competition has been more keenly felt of late years, since the construction of large factories with the most improved machinery, under the best of management, and with help that have become efficient from long

experience. Cotton manufacturing in the South is not what it was ten or fifteen years ago, when the machinery in the mills was poorly balanced, even for the manufacture of goods that were then being made. This has been rectified in recent years, not only in the old, but in the new, mills. The going on to a finer class of manufactures has also had its detrimental effect upon the manufactures of New England, forcing the latter to a higher and more intricate standard of fabrication. It is only a comparatively few years ago when the majority of the machinery in the South was old, superannuated, and, consequently, less productive than that existing in the North. These conditions no longer exist to any material extent.

In the Arkwright report, there are various points touched upon, showing the advantages that Southern mills possess in their competition with those of New England, in the manufacture of cotton fabrics. Aside from that of wages, which is of the most material consequence at the present time, mention is made of the "delightful climate of the Piedmont District, which is well adapted to cotton manufacturing," where artificial moistening of the atmosphere is not so essential as it is in the North, greater freedom from legislative interference, saving in the cost of fuel, freedom from the pernicious influence of organized labor, and lower cost of mill construction. All of these points that have been presented statistically, we have been to the trouble of tabulating. This table will give all of the essential points dwelt upon in the report, and a quick comparison as therein stated can be made between the conditions existing at the North and South.

Manufacturers in New England all recognize the fact that this competition exists, and that there is a great depression in the industry, but there are different views regarding the proper remedy. Some attribute the condition of affairs to the Wilson tariff, and that its beginning was five years ago, when Mr. Cleveland was elected president and the free trade cause came on top. There are a number, however, who do not believe that the depression is wholly due to Southern competition, and what there may be in the latter, is but temporary, and that under normal conditions, those inherent to the North are sufficient to offset it. As one manufacturer puts it, it is due to under-consumption on the part of the people, which we think is, in a large measure, well taken, owing to the forced economies that the people have been obliged to practice during the last few years, affecting not only the manufacture of cotton, but all manufacturing industries, and all branches of trade and commerce.

It should be remembered that the great bulk of the cotton goods that were manufactured during the past year, were made from comparatively high priced cotton, upon which there has been a necessary loss.

It is unfortunate that the industries of any State should be placed at a disadvantage with those of any other State, on account of legislative inequalities, but we see no way by which this can be remedied, as it is hardly to be expected that the legislatures of all manufacturing States will agree to a uniformity of laws, affecting the employment of persons in manufacturing establishments. This uniformity can be brought about only through national legislation, which it will be most difficult to accomplish; and even if a constitutional amendment could be secured, permitting such national legislation, it would be a question whether it would be advisable, or for the best interest of our manufactures, for were any congressional action in this direction to be taken, it would almost surely be controlled by influences more or less inimical to corporate capital, placing the industries of this country in a more disadvantageous relation with those in foreign countries, totally effacing any possibilities of successful competition in foreign markets.

It is not to be presumed that New England is to lose her cotton manufacturing industry, due to any competition that is likely to come from the South. The North has advantages in

manufacture which the South does not possess, a most potent one being its climate, for intense and continued exertion on the part of employees. As to climatic influences upon the working of cotton, these can be regulated now to a very fine degree, by artificial methods of moistening the atmosphere. The climate of the South is more or less enervating, even in the most favorable parts of it, affecting all persons in any line of occupation, inside or outside of the factory, by producing a languidness that is noticeable, when compared with the physical energy observed in the people of the New England States. This is so patent to everyone who is familiar with the people in the North and South that it needs nothing more than mentioning. The North, also, has the advantage of generations of training, on the part of its mill population. It has, and probably will long retain, in its mills the most successful and best trained help. It has the advantage of capital, comparatively low rates of interest, good credit, concentration of mills and shops, and proximity to markets.

There are two sources of relief. In giving more attention to specialties, which means the production of finer and a larger variety of yarns; and the building up of a larger export trade. In order to do the latter, more attention will have to be given to the peculiar wants and fancies of foreign consumers. Channels for an export trade should be kept open at all times, and agencies for such disposition of goods kept established. Seven years ago, we exported about three per cent. of the total value of our cotton manufactures; since then, the export trade has risen to only about eight per cent. of their value. It would be well if this could be extended, especially in times of depression, the same as is done by manufacturers in other countries, even if the goods are disposed of at cost, or even less. Do not unload a surplus on the domestic market, if a foreign market can be got at. Economies can be practiced, no doubt, in the sale of goods, and in the management of mills, especially in the salaries paid to many treasurers, some of whom are well worth what they receive, while others hold their positions because of family influence.

Low wages do not always mean low cost of production, and a poorly fed, poorly housed, and poorly clothed operative, or workman, is not what society wants, or what is conducive to a healthy industry.

The average lower wages in Southern, as compared with Northern, mills, is due very largely to the employment of children in factories. There are no authentic statistics relating to the employment of children in the factories of this country, since the census of 1890. According to that census, the number of hands employed in New England mills was made up of 43 per cent. men, 50 per cent. women, and 7 per cent. children. At the same time, the number employed in the South, consisted of 35 per cent. men, 40 per cent. women, and 25 per cent. children. The same proportion of children were employed in the South in 1890 as in 1880, while in the North, the proportion declined from 14 per cent. to 7 per cent. The Southern laws are not restrictive in the employment of children in manufacturing establishments. It would be well if there were such laws; still, so long as they do not exist, the Southern mill is placed, to a limited extent, at an advantage over the Northern mill, but the effect is detrimental to the general community. In the matter of taxes and insurance, we do not think that the South has any particular advantage over the North. At any rate, the average of statistics in these particulars does not show it.

According to the 1890 census—somewhat antiquated, though not without its interest—the cost of labor per thousand cotton spindles at that time was $46.32 on the North, and $45.80, in the South; but, in this connection, it should be borne in mind that the hours of labor were longer in the South than in the North, and the work coarser. Also, it may be noted, that in 1890, the number of hands per thousand spindles, was 13.72 in the North, and 23.42 in the South. The

condition of work and efficiency of labor should be taken into account, in considering these figures.

An interesting feature may be noted in the character of the population of the South, where there is a small proportion of foreigners, and what exists is largely concentrated in cities. Practically all of the help in the cotton mills of the South are native whites. This social condition has changed but little within the last twenty or twenty-five years. For instance, the percentage of total population of foreign parentage, in 1870, was .60, in North Carolina; 2.53, in South Carolina; and 2.01 in Georgia. In 1880, the percentages were .77, 2.18, and 1.89; and in 1890, 70, 1.53, and 1.78, in these States, respectively. So long as there is a native population in the South, there is but little danger of labor organizations getting a strong foot-hold. Strikes and agitation in manufacturing communities among the help, are due chiefly to the influences of foreign methods, brought in by a foreign population, and are usually entered into by those who have no ambition or expectation of rising above the level of ordinary laborers.

Should the factories of the South ever lose their hold upon the native population for their help, they will have the negro population to fall back upon, which will be much more desirable for factory employees, ten or twenty years hence, than it is to-day. The Southern factory population may pass through similar phases as has been experienced in New England, where thirty years ago the factory population was made up principally of the sons and daughters of New England farmers, but now their places are taken by foreigners, first, mostly, by Irish, and later by French Canadians, while in some of our manufacturing centres there has grown up a considerable population of Poles and some of the least desirable people from Central and Southern Europe.

NEW INDUSTRIES.

There are many items of interest in the improvements that have taken place in the textile manufacturing lines within the last six months. Woolen mills have been particularly prosperous, and there are many instances of restoration of wages. The tendency to greater differentiation in the processes of worsted manufacture has been particularly noticeable since the present tariff came into force. The separation is tending more and more to the conversion of worsted manufacture into three parts, in making of tops, of yarn, and of fabrics. A great deal of the work in the first two branches is done on commission. Several establishments have taken up this work. There are several conspicuous instances of English capital coming to this country to be invested in the manufacture of new classes of fabrics, for examples, the manufacture of astrachan cloth is to be undertaken by Yorkshire capitalists, in Pennsylvania; silk plushes, by English parties, in New Jersey; worsted fabrics, by Huddersfield parties, in Pennsylvania; and silk velvets, in Connecticut, by German capital. New England capital is being solicited for cotton manufacturing, in Missouri, while some of it is still going southward, also into cotton manufacturing. The favored localities in the latter section, at present, seem to be in Alabama and northern Georgia.

FAILURES FOR 1897.

The statistics concerning commercial failures in 1897 show a marked improvement so far as they relate to business conditions, over 1896. According to Dun's Review, the average of liabilities for failures in the last half of 1897 was only $9,593, which has never been equalled in any other half year, for even in 1892 the average was $10,477, and in the last half of 1879, when the wonderful improvement came after resumption of specie payments, the average was $12,440. The third quarter, as was shown in October, made a surprising record of gain, and surpassed in smallness of liabilities any other third quarter on record. Though the fourth quarter usually

shows larger and more numerous failures, and did in 1897, yet in that quarter also the average of liabilities was lower than for any other fourth quarter of the record, being only $10,150 per failure. In one quarter of 1894 this was closely approached, but not very closely in any other year.

In the wool manufacturing branch of industries the amount of liabilities of failed concerns was only $1,491,860, against $8,364,198, in 1896. The cotton manufacturing industry, however, did not compare so favorably, as the liabilities of the failures in that industry for 1897, were $9,800,716, against $2,649,339, in 1896.

—It appears that S. H. Slaught is at it again with his ramie schemes, to obtain from the government a large appropriation amounting to $330,000. As there is plenty of private capital that is willing to undertake anything of this sort, if it shows a feasibility and profit, the necessity of the government entering into any operation of this kind is not apparent. Mr. Slaught's onslaught on the treasury of the United States ought to be stopped. There has been introduced into the Senate of the United States a resolution, submitted by Senator Chandler, to allow Mr. Slaught the ownership of the stereotypes used in his ramie documents, that was published at public expense, last year. The effect of this would be to give this gentleman an opportunity to get out pamphlets relating to his schemes, in which the government supplies part of the capital. We hope that the members of Congress will see that this resolution is pigeonholed.

—The increased exports of raw cotton to Japan from this country, is worthy of note. For the first ten months of 1897, the exports of cotton to Japan nearly equalled those to Canadian mills. For this period the exports amounted to 26,722,398 pounds, against 15,325,276 pounds for the corresponding time a year previous. This rapid increase in the export of American cotton to the mills in Japan will be better appreciated when it is stated that the exports for 1888-89 amounted to only 23,500 pounds, and in 1892-93 to only 793,242 pounds. The beginning of the recent advance in exportations was in 1894-95, when the exports reached over ten million pounds, and the next year over twenty million pounds.

—We note that our foreign exchanges are taking from our pages, bodily, many of our leading articles, without so much as giving us the slightest degree of credit. In this particular, we note that the "Textile Manufacturer," of Manchester, is among the guilty ones, which is much to our surprise, considering the standing this publication has in the textile trade. In one of its recent issues appeared three of our leading articles, without the remotest reference to the source whence they were obtained.

—The Treasury Department has taken the view that ordinary goat hair shall be admitted free of duty, under the 1897 tariff act. This is as we stated would be the case at the time that the act was passed, and no other common-sense view can be taken of the interpretation of the law. More that this, this decision on the part of the Treasury Department conforms with decisions under previous acts affecting this article.

—The labor troubles in Great Britain, among the engineers, is felt to some extent in this country, in the difficulty of obtaining English machinery for some of our textile mills. One mill that has devoted a large portion of its machinery to linen fabrics, has been waiting four to five months over time for their finishing machinery, that it must have before it can go on with its manufactures.

—The cotton crop for this season is superior in nearly all of its qualities to that of last season. As near as we can ascertain from numerous inquiries from the largest cotton buyers for the New England mills, the crop, in cleanliness, is one per cent. better than last year, in length of staple, six per cent. better, and in spinning qualities, ten per cent. better, while the average grade is about the same.

THE TEXTILE WORLD'S ANNUAL REPORT OF MILL CONSTRUCTION FOR 1897.

Our usual annual report of the statistical status of textile mill construction for 1897, we herewith present, believing that it is as complete and accurate as it is possible to make it, after a most careful system of compilation extending throughout the year. The reports that have come to us concerning the construction of new mills and the projection of new enterprises have been verified by correspondence with the parties in interest or by personal interview.

COMPARISON OF NEW MILL CONSTRUCTION WITH FORMER YEARS.

	1897	1896	1895	1894
Cotton	49	66	59	23
Woolen	53	31	33	17
Knitting	71	85	80	40
Silk	43	17	10	11
Miscellaneous ..	14	8	16	23
	230	207	198	114

In our list of new mills, we have included only such as have been put in operation during the year, or are so far completed that they will begin operation within the first few months of 1898. Our list of projected industries includes the mills which are being constructed and will begin production later in the year; also, those which are contemplated, plans of which are being made, and will, without doubt, be in the process of construction at no distant date.

Taken as a whole, there appears to have been a statistical growth in the number of new concerns in the textile industries. As will be seen, there was an increase of 23 in the number of new mills in 1897, over that in 1896; of 32 over 1895; and 116 over 1894. There was a marked falling off in the number of new cotton mills, as compared with 1896, but a fair showing with 1895 and 1894. The generally unsatisfactory status of cotton manufacturing during the year had much to do with this falling off. This is more noticeably seen in the comparatively few cotton mills that are projected, as seen in the accompanying table, compared with the previous two years. We have account of only 15 cotton mills projected for 1898, as compared with 47 for 1897, and 69 for 1896. On the other hand a decided improvement is noticed in the woolen and silk industries.

PROJECTED MILLS IN 1897 AS COMPARED WITH 1896 AND 1895.

	1897	1896	1895
Cotton	15	47	69
Woolen	8	7	10
Knitting	7	17	13
Silk	3	5	3
Miscellaneous	0	3	1
	33	79	96

We also give an exhibit of the geographical distribution of the mills projected in 1896. It will be seen that the building of cotton mills outside of the South is not contemplated, of which we have any account. Plans for a large print mill, with $300,000 capital, have been made, to be erected

	South	*N. E.*	*Elsew're*	*Tot'l*
Cotton	15	0	0	15
Woolen	0	3	5	8
Knitting	3	1	3	7
Silk	0	0	3	3
	18	4	11	33

COMPARISON OF SPINDLE GROWTH WITH FORMER YEARS.

	1897	1896	1895	1894
New England.				
New Mills	35,840	240,352	211,662	39,060
Enlargements	31,240	4,560	66,156	100,348
Southern States.				
New Mills	256,780	382,045	493,280	143,572
Enlargements	150,094	42,000	152,800	119,709
Middle and Western States.				
New Mills	4,000	24,000		19,000
Enlargements		10,000	14,000	
	477,954	702,957	937,898	421,689

Number of Spindles in New Mills, 3897	296,620
" " " " Enlargements, 1897	181,334
	477,954

in South Carolina. Three cotton mills are contemplated in Texas, one with $50,000 capital, and another with $100,000 capital. A mill is to be built in Columbia, S. C., to be operated by negro help.

Plans for three woolen mills are being entertained for the New England States, and five outside of these States, one with English capital, to be established in Pennsylvania.

Our table showing the comparison of spindle growth with former years, is of interest, showing that there was a very considerable decrease in the number of new spindles for 1897, as compared with either 1896 or 1895. Very little was done in increasing the cotton spinning capacity of New England. There was, however, considerable activity in the Southern States in this respect, not only in the number of spindles that went into new mills, but the increase of the spindle capacity of mills already established. We furnish a table in detail of the cotton mills for 1897, showing the number of mills, spindles and looms. Of the 37 mills in the South, nine did no spinning, leaving the number of spindles (256,780) to be divided among 28 mills. South Carolina took the lead. A number of the Southern mills were equipped for making rope, lamp-wicks, sash-cords, bagging, etc., requiring coarse yarns. A small braid and tape mill was put up in Georgia, and the manufacture of duck was commenced in Louisana.

NEW COTTON MILLS.

	No.	*Spindles.*	*Looms.*
Alabama	4	75,000	2,292
Florida	1	2,000	
Georgia	7	45,000	626
Louisiana	1	1,500	10
North Carolina	9	38,080	80
South Carolina	11	95,200	2,472
Tennessee	3		192
Kentucky	1		
South	37	256,780	5,672
Massachusetts	2	35,840	25
Rhode Island	1		107
New York	1		
New Jersey	3		40
Pennsylvania	5	4,000	
North	12	39,840	172

Of the twelve new mills in the North, the increase in spindle capacity (39,840 sp.) was confined to two mills. Mills for the manufacture of turkish toweling, webbing, quilts and comforters, lace curtains, table damask, and lawn and handkerchiefs, were among the new ones erected.

No large woolen mills were erected in 1897. In the aggregate, however, there was a growth in the productive capacity of the industry compared with 1896. The number of new sets of cards was 60 in 1897, against 45 in 1896. New England had 29 sets, the Middle States 9 sets, Western States 21 sets, with one set in Kentucky. Many of the mills in the Middle States and some in the New England States were equipped to work up yarns only. The plants of two Massachusetts mills were for making tops and yarns

NEW WOOLEN MILLS.

New England		
Maine	2	
New Hampshire	1	
Massachusetts	3	
Rhode Island	4	
Connecticut	4	=14
Middle States		
New York	1	
Pennsylvania	26	
New Jersey	2	=29
Western States		
Indiana	1	
Illinois	1	
Wisconsin	1	
Missouri	1	
Minnesota	1	
Kansas	1	
Wyoming	1	
Oregon	2	= 9
Southern State		
Kentucky	1	
		53

on commission. A new industry was established in Pennsylvania—the manufacture of astrachans. One of the Pennsylvania mills was for combing on commission.

NEW KNITTING MILLS.

New England		
New Hampshire	2	
Vermont	2	
Massachusetts	1	= 5
Middle States		
New York	14	
New Jersey	2	
Pennsylvania	28	
Delaware	1	=45
Western States		
Ohio	3	
Illinois	1	
Wisconsin	2	
Michigan	3	= 9
Southern States		
North Carolina	5	
South Carolina	3	
Alabama	2	
Tennessee	2	=12
		71

The greatest increase in the number of knitting mills was in the Middle States, particularly in Pennsylvania and New York, chiefly for the manufacture of hosiery. The new Southern knitting mills were put on hosiery, almost altogether.

NEW SILK MILLS.

Connecticut		
Velvet and Plushes	2	
Braids, etc.	2	= 4
New York		
Dress Goods	2	
Velvets	1	=3
New Jersey		
Plushes and Velvets	1	
Dress Goods	9	
Ribbons and Novelties	4	=14
Pennsylvania		
Dress Goods	14	
Ribbons, etc.	8	=22
		43

Most of the new silk mills were erected in Pennsylvania and New Jersey, chiefly for the manufacture of broad silks, dress goods, etc. One mill in New Jersey was erected for the manufacture of silk plushes, and one in New York for the manufacture of velvets; also, two in Connecticut for the manufacture of velvets and plushes.

NEW MISCELLANEOUS MILLS.

New Hamphire		
Flax Fibre	1	
Hair Cloth	1	= 2
Rhode Island		
Hair Cloth	1	
New Jersey		
Dye Works	1	
Pennsylvania		
Dyeing and Finishing	3	
Linen	1	= 4
Delaware		
Dye Works	1	
Not known	1	= 2
Iowa		
Flax Yarn	1	
Minnesota		
Crash Towels. New System	1	
Kentucky		
Dye Works	1	
North Carolina		
Dye Works	1	
		14

There were a number of mills constructed in 1897, for miscellaneous products. Yarns from flax have been undertaken by one mill in New Hampshire, one in Pennsylvania, and one in Iowa. A number of dyeing and finishing works have been established in different parts of the country.

ANNUAL REPORT.

—OF—

NEW MILL CONSTRUCTION

During 1897.

EXPLANATION OF ABBREVIATIONS: 12/97=December, 1897, etc.; S=Steam; W=Water Power; E=Electricity; D=Dye House.

NEW MILLS.

COTTON.	Date of Starting.	Number of Employees.	Spindles.	Looms.
ALABAMA.				
Birmingham. Avondale Mills Co. $500,000. Print Cloths. B. B. Comer, president. David Trainer, manager. (S).....	1/98		35,000	1100
Cordova. Indian Head Cotton Mills. Sheetings. Harcourt Amory, treasurer. Boston. (S)	12/37	50	2,000	
Montgomery. Peoples Cotton Factory. (S).....	9/97	300	10,000	320
Spigners Station. State Prison. Sheetings. Walter Meek, superintendent			5,000	72
FLORIDA.				
Jacksonville. American Manufacturing & Commercial Co. Cotton rope. (S).	4/97	50	2,000	
GEORGIA.				
Atlanta. Atlanta Textile Mfg. Co. $20,000. Braid, tape, etc. R. J. Griffin, president. Jas. L. Logan, treasurer				
Douglasville. Georgia Western Cotton Mills. (Col. J. S. James.) Hosiery yarns. (S)	1/98		15,000	
Forsyth. Forsyth Mfg. Co. New building to replace present plant, and increase of 3,000 spindles, making total of 6,000 spindles under construction			3,000	
Griffin. J. D. Boyd Mfg. Co. $50,000. Cotton rope, twine and yarns; (also fertilizer manufacturers). J. D. Boyd, president. Douglass Boyd, treasurer. J. W. Mangham, general manager. (S).	1/98	20	1,000	
Palmetto. Palmetto Cotton Mills. $50,000. Yarns. (S)			5,000	146
Poulon. Aberdeen Mills. $100,000. (S D)	7/97			180
Savannah. Chatham Cotton Mills. $150,000. J. L. Whatley and Samuel Hale interested			15,000	300
KENTUCKY.				
Paducah. Cohankus Mfg. Co. (Also at Hohokus, N. J.) Rope and yarn. F. P. Toof, Box 234, Paducah, Ky., superintendent. Under construction				
LOUISIANA.				
New Orleans. New Orleans Cotton Mfg. Co. Duck. E. V. Reiss, president. A. L. Center, secretary and treasurer. (S D)			1,500	10
MASSACHUSETTS.				
Fall River. Arkwright Mill. $500,000. Jos. A. Bowen, president. John P. Bodge, treasurer. (S)	2/98		35,840	900
Fall River. John Bolton, 2016 Highland Ave. Fancy cotton goods				25
NEW JERSEY.				
Athenia. A. W. Pierson & Co., of Southport, England. Silks and plushes. Machinery from England	1/98	500		
Deckertown. Mellor Mfg. Co., formerly 52 Garfield Ave., Paterson, Turkish toweling	12/97			
Mt. Holly. Bidwell & Hughes. Standard Hammock Mills, formerly John A. Bidwell, 22 Ashmead St., Philadelphia. New mill built for them here. (S)	9/97	80		40
Union Hill. A. J. McIntosh Mfg. Co. $50,000. President, A. J. McIntosh. Treasurer, J. H. McIntosh. Down quilts and cotton comforters. (S)				
NEW YORK.				
Jamestown. E. J. Ashwell & Co., Foote Ave. Lisle thread. Buy yarn				

COTTON.—Continued.

	Date of Starting.	Number of Employees.	Spindles.	Looms.
NORTH CAROLINA.				
Albermarle. Efird Mfg. Co. $45,000. Hosiery yarn. (S)			4,000	
Bessemer City. Bessemer City Cotton Mills. $50,000. Yarn, 8s to 20s. President, J. A. Smith. Treasurer, J. A. Pinchback	4/98	120	5,000	
Charlotte. Magnolia Webbing Works. A. C. Summerville, proprietor. Narrow fabrics. Moved from Cincinnati, O.	9/97			
Concord. Coleman Mfg. Co. $500,000. R. B. Fitzgerald, president. W. C. Coleman, secretary and treasurer. 7,000 to 10,000 spindles. Will employ colored operatives. (Under construction)			7,000	
Fayetteville. Phoenix Cotton Mill. Building which was never equipped bought by Edward Williamson, Graham, N. C., who will put in 5,000 spindles to make yarn			5,000	
Hillsboro. Eno Cotton Mills. $100,000. A. J. Ruffin, president. Jas. Webb, Jr., treasurer. Yarn 8 to 40. (S)	7/97		5,000	
Rockingham. Rockingham Textile Mfg. Co. $25,000. Lamp wicks, sash cord, back bands, rope. (S)				
Troy. Smitherman Cotton Mills. Sheetings. S. J. Smitherman, president. A. W. E. Capel, treasurer. (S)	1/98		2,080	80
Waxhaw. Rodman Heath Cotton Mills. Yarns. J. L. Rodman, manager. Under construction; will be completed in 1898. (S)			10,000	
PENNSYLVANIA.				
Chester. T. I. Birkin & Co. (also 1310 Lawrence St., Philadelphia). Lace curtains	1/98	300		
Easton. Chas. Chipman's Sons (hosiery manufacturers) bought Matteawan Mill and fitted for making hosiery yarn	4/98	100	4,000	
Philadelphia. Harry Belcher, Elizabeth and Unity Sts., Frankford. Table damask. (S)	4/97			4
Philadelphia. Schell & Davies. Damask				8
Reading. Keystone Handkerchef Co., 143 Cedar St. M. H. Seidel, Alonzo Baumner. White lawn and colored handkerchiefs				
RHODE ISLAND.				
Providence. National Elastic Webbing Co., 85 Sprague St. Elastic goods		75		107
SOUTH CAROLINA.				
Abbeville. Abbeville Cotton Mills. $300,000. B. F. Bailey, president and treasurer. May add 5,000 spindles soon. (S)	6/97		10,000	304
Central. Norris Cotton Mills Co. $150,000. D. K. Norris, president and treasurer. (W)	9/97		10,000	228
Cheraw. So. Carolina Braiding Works. $50,000. E. A. Palmer, manager. Cordage and lines. (S)				
Clio. Red Bluff Cotton Mills. $50,000. Alex McRae, president. J. R. Mallonee, treasurer. Yarns 30s to 50s. (W)	2/98	100	5,200	
Taylorsville. U. L. Alspaugh. Sheeting and drills. (S and W)	3/97			24
SOUTH CAROLINA.				
Graniteville. Warren Mfg. Co. $200,000. Prints. President and treasurer, E. F. Verdery. (S)	5/98		30,000	
Greenwood. Grendel Cotton Mills. President and treasurer, D. A. P. Jordan. Brown cotton. (S)	8/97		10,000	336
Orangeburg. Enterprise Cotton Mills. $60,000. Samuel Dibble, president and treasurer. (S)	10/97		10,000	300
Prosperity. Prosperity Mills. $65,000. L. S. Bowers, president. J. M. Wheeler, treasurer. (W)	10/97		5,000	200
Spartanburg. Arkwright Mills. $200,000. Drills and sheetings. V. Z. Cates, president and treasurer. (S)	10/97		10,000	300
Winnsboro. Fairfield Cotton Mills. $85,000. Export unbleached homespuns. D. M. Thompkins, president. J. M. Beatty, treasurer. (S)	11/97		5,000	180
TENNESSEE.				
Elizabethton. Tennessee Cotton Mills. $100,000. L. A. Briggs, president. F. Hill, treasurer. M. E. Clark, general manager. Cotton yarn, 10s to 20s. New building 150x150	1/98			
Newport. Newport Cotton Mill Co. $50,000. Checks, colored shirtings, plaids. (S D)	3/97			192
Pulaski. B. F. McGrew. Sash cord and bagging	10/97			

WOOLEN.

	Date of Starting.	Number of Employees.	No. Sets and width cards.	Looms.
CONNECTICUT.				
Huntington. Joseph W. Bentley. White blankets. Expects to add 8 looms later. (W D)	10/97		1	2
Mystic. Mystic Mfg. Co. Fine worsted suiting and trouserings. (S D)	2/98	50	5	28
Mystic. Alex Smith (in old Greenmanville Mill.)	1/97		5	26
New Haven. Weeks & Co., River St. Shoddy				
ILLINOIS.				
Springfield. Frank Godley. Shoddy. Mill burned Nov. '97; will be rebuilt. (S D)			6	
INDIANA.				
Connersville. White Water Carpet Mills. $25,000. Rugs and carpets. Chas. Mount, president and treasurer				25
KANSAS.				
Topeka. Topeka Woolen Mill Co. Woolen goods. Specialty "Sunflower Pants." 2 48-inch cards. 10 broad looms. (S D)	10/97	75	2	10
KENTUCKY.				
Phil. O. C. Russell & Co. Yarns, flannels, blankets, etc. (S D)	6/97		1	7
MAINE.				
Fairfield. Kennebec Worsted Co. Sampson & Williams. Worsteds. (S)	6/97	75		28
Lee. J. T. Gifford & Sons. Satinets	10/97		1	
MASSACHUSETTS.				
Clinton. Sterling Worsted Co. $30,000. Geo. S. Griffin, Chas. Frazer, Sr., Jas. Connell. Under construction. (S D)	3/98	40	2	20
Hudson. Hudson Worsted Co. Jas. Watmough, manager. Worsted yarns on commission. Mill formerly was scouring plant. 1300 spindles. (S)	12/97	50		
Lawrence. Frederick Butler. Commission combing. 5 combs	12/97			
MINNESOTA.				
Rochester. Rochester Woolen Mill Co. $20,000. Flannels, blankets and cassimeres, suitings and dress goods. (S D)	5/97	59	3	
MISSOURI.				
Sullivan. R. R. Loewenstein & Co. Woolen goods (S D)	3/98	75	2	12
NEW HAMPSHIRE.				
Lakeport. Rutter Bros. Woolen and merino yarn. Located in Bayside Mill. (S D)	2/97		2	
NEW JERSEY.				
Camden. Geo. Shimer & Son, 5th and Erie Sts. Worsted yarn. Sell direct. 2 combs. (S)	5/97	50		
Passaic. Griffon Co. $25,000. 25 Central Ave., Passaic. Rudolph Kraft, agent. New York office, 112 Spring St. Worsted dress goods. (S)	6/97			50
NEW YORK.				
Yonkers. Crown Smyrna Rug Co. $15,000. Rugs and carpets. (S D)				16
OREGON.				
Portland. Pacific Woolen & Clothing Mfg. Co.	6/97		2	
Union. Union Woolen Mills Co. $20,000. Blankets and flannels. A. E. Eaton, president. J. F. Lever, general manager. (W D)	8/97		3	6
PENNSYLVANIA.				
Chester. David Armitage & Son, from Yorkshire, England. Astrachan cloth	2/98	100		
Curwensville. W. A. Murr. Horse blankets, carpets. Buys yarn. (S)	9/97			10
Millville. Edward Thorpe. Worsted yarns. 1400 spindles	3/97		2	
Mohn's Store. Globe Hat Works. Isaac S. Spatz. Wool hats. (D)			2	
Norristown. Wm. E. Montague. 12 special broad rug looms. Carpets. Buys yarns	1/97			12
No. Warren. Hazeltine Woolen Mills Co. Cassimeres, flannels. Rebuilt plant burned April, '97			1	7
Philadelphia. Bright & Sloane, cor. Howard and Palmer Sts. Fancy worsted suitings	1/98			
Philadelphia. Edward Shumacher. In old Edwards Mill, Indiana Ave., below Front St. Worsteds and novelty dress goods	1/98			
Philadelphia. D. L. Taylor. Wallace's Mill, Manayunk. Woolen goods				
Philadelphia. Dingley Mfg. Co. $20,000. 31st and Read Sts. Leased old mill building	1/98	50		
Philadelphia. Phenix Mills Co., also of Chester, Pa. Purchased Glenmore Worsted Mills, 19th and Germantown Ave. High grade worsteds				
Philadelphia. Keystone Textile Mills, leased Sonneborn Mill and equipped for making hammocks, etc. B. J. Hoffman, secretary	11/97			10
Philadelphia. Taylor Bros., 84 Mill St., Germantown. New mill 100x25				
Philadelphia. Wm. F. Davis, Main and Chestnut Sts., Manayunk. Carpet yarn. 504 spindles. (E)	9/97		3	

WOOLEN.—Continued.

	Date of Starting.	Number of Employees.	Date of Start-width cards.	Looms.
PENNSYLVANIA—continued.				
Philadelphia. Baltz Bros. Ripka Mills, Manayunk. Carpet yarn	8/97			
Philadelphia. Albert Sykes & Co., 1909 N. 6th St. Rugs. (S)	8/97			10
Philadelphia. M. W. McDonnell & Co., in old Pekin Mill, Manayunk, now known as Castle Bank Mill	8/97			
Philadelphia. John W. Wood. Leased Bridge Worsted Mills. Worsted yarns. 2,000 spindles	8/97			
Philadelphia. W. T. Smith & Son, Mascher and York Sts. Art square carpets	6 /97	30		22
Philadelphia. C. W. Thomason, American and Diamond Sts. Commission combing	5/97			
Philadelphia. Lawrence Collins. Riverdale Carpet Mills. Kensington and Allegheny Aves. Ingrain carpets				10
Philadelphia. Newbold & Renton, 3340 Waterloo St. Jute rugs and carpets				14
Spartanburg. Edwards Woolen Mills, Edwards Bros. $15,000. Dress goods, blankets, flannels, yarns, etc. (S D)			1	6
Stroudsburg. Geo. H. Harvey. Also of the Gobelin Tapestry Co., Philadelphia. Carpets	9/97			
Taylor. Brock Worsted Mills. J. L. W. Brock, proprietor. Fine worsted for men's wear. Will add 20 looms during the year	1/98			20
Wallingford. Columbia Worsted Co. Building new mill at Todmorden. 200x50, 1 story. (Also mills at Wallingford.)				
RHODE ISLAND.				
Mohegan. Mohegan Mill, Keyes D. Brown, proprietor. Built on site of mill destroyed by fire. (W)			8	
Nasonville. Nasonville Woolen Co. Wilcox & Wells, proprietors. New mill built on site of mill burned May, '96. (W S D)	12/97		5	20
Olneyville. Earncliffe Mill, Guile & Waterhouse, proprietors. Fine worsteds	1/98	200		
Thornton. Chas. Fletcher. Pocassett Worsted Mills. Two large buildings				
WISCONSIN.				
Mauston. John M. Stickler. Flannels, blankets. (S D)	7/97		1	3
WYOMING.				
Afton. Star Valley Woolen Mills. E. Buckley & Sons. Blankets, sheeting, cassimeres and batting. Also knitting machinery. (W D).....	6/97		2	4

KNIT.

	Date of Starting.	Number of Employees.	No. Ktg. Mchs.
ALABAMA.			
Anniston. Anniston Hosiery Mill. Men's and children's hosiery. Moved from Jacksonville, Fla. (D)	12/97	50	
Huntsville. Huntsville Knitting Mills. M. P. Mosely, manager. Hosiery			16
DELAWARE.			
Smyrna. Smyrna Shirt & Hosiery Factory. Clarence & Edwin Prettyman, proprietors. Misses' and children's ribbed hosiery. 66 sewing machines			55
ILLINOIS.			
Chicago. Bloch Knitting Mill, 358 Dearborn St.. To increase soon.	10/97	10	8
MASSACHUSETTS.			
Southbridge. Foley & Hagerty. Delhanty's Block. Hosiery			
MICHIGAN.			
Grand Rapids. Globe Knitting Works. $25,000. 62 Pearl St. Children's ribbed underwear. (E)	9/97		8
Muskegon. Louis P. Haight. Fine worsted and silk knit specialties for children	7/97		
West Bay City. Galbraith & Son. Seamless ribbed hosiery			6
NEW HAMPSHIRE.			
Hookset. Lakota Co. $10,000. Ladies' hosiery. A. E. Mason, treasurer	12/97		15
Lakeport. Wm. T. Swain & Co. Hosiery, golf and bicycle hose, etc.			25
NEW JERSEY.			
Glassboro. Glassboro Knitting Co. J. L. Johnson, Wm. C. McCutcheon, J. S. J. McCutcheon. Seamless half hose	4/97		
Saddle River. Thurston-Clark Hosiery Co. New mill to replace building burned Nov. '97, of H. W. Thurston. Ladies' and children's hose and half hose. (W D)	1/98	40	36

KNIT.—Continued.

	Date of Starting.	Number of Employees.	No. Ktg. Mchs.
NEW YORK.			
Amsterdam. Harvey & Dovell. East End Knitting Mills, Elk St. Mr. Harvey was formerly manager of the Continental Knitting Co., whose plant was burned in March, 1897.	6/97		15
Athens. Athens Knitting Co. President, Frederick Jessup. Treasurer, F. J. Sagendorph. Underwear. 4 sets woolen	1/98	100	30
Averill Park. Faith Knitting Co. $60,000. Operates the Beverwyck Mills and the plant formerly owned by Isaac and A. D. McConihe, Sand Lake, N. Y.			
Brooklyn. Christian Zimmerman & Son, of Apolda, Germany. Geo. Mueller, agent, 55 White St., N. Y. New building 50x115, 3 story, cor. Hamburg Ave. and Chauncy St. Silk, woolen and cotton fancy knit goods	4/98	150	
Brooklyn. Wm. Sauter. Anchor Knitting Mill. Sweaters			
Cohoes. M. Akin. Enterprise Mill. John Scott, Jr., manager. C. and W. hosiery. 5 sets wool cards; 1200 jack spindles	10/97	100	15
Fonda. Hilton & Radcliffe. Underwear. 4 sets; 18 cylinders. (S)			
Fort Hunter. Forest Knitting Mills. Children's and misses' fine ribbed cotton underwear. (S)	1/98		30
Lansingburg. Meeker & Link. Balbriggan underwear. 16 cylinders		60	
New York City. Continental Golf Stocking Mfg. Co., 46 E. 14th St.			
Hudson. Union Knitting Co. Now rebuilding plant burned in Oct. '97. (S)			40
Little Falls. Elboeuf Knitting Co. H. G. Babcock and John B. Morgan. Sweaters, golf hose, sporting goods. (E)	11/97	15	12
No. Hoosick. Glasgow Knitting Mills Co. Wool sweaters. Jas. G. Byars, Jr., secretary and treasurer. Chas. A. Rieb, superintendent. Buys yarn. 10 sewing machines. (W)	4/97		12
Waterloo. Waterloo Knitting Co. $25,000. Wool underwear and specialties	4/97	70	
NORTH CAROLINA.			
Burlington. Daisy Hosiery Mills. Proprietors, W. C. Curtis, J. Stewart, Jr. (S D)	1/98	10	10
Graychapel. A. G. Hough. Seamless hosiery. Formerly at Millboro, N. C.			4
Greensboro. George Mfg. Co. $10,000. Hosiery. Reported sold in Oct. '97, to W. E. Stone & Co.	4/97		12
Roanoke Rapids. Roanoke Underwear Co. $100,000. Cotton underwear. Chas. Cohen, president. W. M. Hubbiston, vice-president. Joseph B. Pugh, treasurer and general manager			
Tryon. Tryon Hosiery Co. L. N. Wilcox, proprietor. Ladies' hose. Knitting machines will be increased to 50, later. (W)			15
OHIO.			
Barnesville. Peerless Hosiery Co. Woolen hosiery			
Piqua. Piqua Hosiery Co. Built new building to replace mill burned Sept. '96. 120x36, 3 story			
Piqua. Superior Underwear Co. John P. Spiker, Geo. Davidson. Fine ribbed underwear. (Gas)	10/97	20	3
PENNSYLVANIA.			
Coopersburg. M. B. Bergery & Co. Branch of Souderton, Pa. Half hose	12/97		40
Ephrata. F. S. Weaver. Hosiery			
Hawley. U. S. Knitting Mill. H. Nollan, proprietor. Bicycle leggins and sweaters			10
Lehighton. Mackie & Co. (Moved from Frankford.) Underwear	9/97	75	
Lititz. Keystone Underwear Mills. Samuel B. Erb and others. Building under construction	1/98		
Mechanicsburg. Mechanicsburg Hosiery Mill. D. F. Beaver, proprietor. W. B. Railing, manager. (Branch of Waynesboro Hosiery Mill.)	10/97	20	25
Norristown. Star Hosiery Mills. Lewis E. Taubel (formerly dye house.) Seamless hosiery			32
Norristown. Rambo & Regar. (Also proprietors Globe Knitting Mills.) New building 40x195, 4 story. (S D)			
Orwigsburg. Orwigsburg Knitting Mill. Koch & Sharidan. Ladies' underwear			5
Perkasie. H. A. Moyer, Grier Scheetz and Mahlon Keller, interested	12/97	50	
Philadelphia. Saxony Knitting Mills, 3829 Frankford Ave. $20,000. Geo. R. Randall, treasurer. Hosiery. (S)	1/98		20
Philadelphia. C. Welsey Weldin, cor. Second and Diamond Sts. Men's and children's cotton hosiery. 3-4 automatic machines	11/97	50	
Philadelphia. Hygiene Fleece Lined Underwear Co, 1716 No. 5th St. Cotton and wool underwear. In plant formerly operated by Thomas A. Pearce & Co.			
Philadelphia. J. H. Sprowles & Co. Columbia Hosiery Mills. Moved from Spring City, Pa., into new building, cor. Clearfield and Ruth Sts. Double sole half hose and ladies' hose. (S)	10/97	50	40
Philadelphia. Wakefield Hosiery Co., 5155 Wakefield St., Germantown. $50,000. Fine seamless cotton hosiery. Chas. Chipman, president. Wm. V. Parker, treasurer. 25 sewing machines. (S D)	9/97	300	200

KNIT.—Continued.

	Date of Starting.	Number of Employees.	No. Ktg. Mchs.
PENNSYLVANIA—continued.			
Philadelphia. Charmwood Hosiery Mills, cor. Lehigh Ave. and Mascher St. Full fashioned half hose			
Philadelphia. Samuel Bramwell, 5339 Puliski Ave., Germantown. 8 ribbers; 2 loopers	6/97		8
Philadelphia. Oriental Knitting & Mfg. Co. $30,000. Howard and Harrison Sts. Frank Clewly, president. P. J. Courtney, treasurer. Fancy knit goods	5/97		
Philadelphia. Schwartz Hosiery Co, 444 Sixth Ave.			
Phoenixville. Lewis Parsons. Operates plant formerly occupied by Byrne, Parson & Co., who built new plant. Hosiery			
Pottstown. Fritz and Krouse. Misses' hose and half hose. Branch of their Royersford mill. (Gas engine.)	9/97		40
Reading. Kuersten & Rick, 222 Cedar St. Seamless hosiery			100
Reading. Jackson & Wm. De Hart, 2nd and Buttonwood Sts. Hosiery	11/97	50	
Reading. Weber & Paxson. Keystone Knitting Mills, 217 Church St. Seamless hosiery			10
Spring City. Chester Knitting Co. Jas. and Wm. H. Rogers. Jersey ribbed underwear			
Union Deposit. A. N. Kuhn. Hosiery	11/97		
Wilkesbarre. Yaple & Zimmerman. Fine seamless half hose. (S)	1/98	30	25
York. York Knitting Mills. Henry E. Field, Fred R. Chase, Morris L. Kalbach. Seamless hosiery. (S)	1/98	250	200
SOUTH CAROLINA.			
Beaufort. Beaufort Knitting Mill Co. $20,000. Hosiery. (W)	5/97		40
Columbia. J. M. Graham. Moved from Hopkins, S. C.			75
Manning. W. Scott Harvin. $10,000. Men's, ladies' and misses' hosiery			25
TENNESSEE.			
Lenoir City. Dixie Mills. $10,000. Men's and ladies' cotton hose. (S W D)	5/97	25	20
Nashville. Lakeshore Knitting Co. Jacob May, manager, 119 Belmont Ave. Men's, women's and children's cotton and wool hosiery. Buys yarn. (S D)	3/97		200
VERMONT.			
Jonesville. Baker Underwear Co. Branch of Peekskill, N. Y. R. J. Robinson, manager. Children's underwear	9/97	50	
Lyndonville. Lyndonville Knitting Co. $10,000. L. B. Harris, manager. (E)	1/98	25	
WISCONSIN.			
Milwaukee. Milwaukee Hosiery Mills, 19th and Lloyd Sts. $10,000. H. H. Schwarting, president. H. H. Rice, secretary. Geo. Geil, treasurer. Gloves, mittens, hosiery and socks			
Stevens' Point. H. S. Blake & Co. (Also at Racine, Wis.) Ladies' hose	1/98	45	40

SILK.

	Date of Starting.	Number of Employees.	Spindles.	Looms.
CONNECTICUT.				
Middletown. Portland Silk Co. James Miller. Silk. Moved from Passaic, N. J.	10/97			
Mystic. Rossie Velvet Co., of Suechtein, Prussia, care Wm. Openhym & Sons, 42 Greene St., New York City. Silk velvets	2/98	100		
Shelton. A. & S. Blumenthal, 210 W. 89 St., New York City. Silk, velvet, plush. Under construction		150		
Yalesville. Armstrong Braiding Co. $15,000. A. H. Armstrong, president. H. L. Harding, secretary and treasurer. Silk and mohair braids.				
NEW JERSEY.				
Athenia. A. W. Pierson & Co., of Southport, England. Silks and Plushes Machinery from England	1/98	500		
Paterson. Baker & Schofield Co. $25,000				
Paterson. Capella Silk Co. J. C. Nightingale. $10,000				
Paterson. Miller & Ward, cor. Paterson and Harrison Sts. Broad silks	10/97	40		32
Paterson. Cardinal Silk Co. $30,000. A. Cardinal, president. R. H. Matthies, treasurer. Dress silks, linings, etc. (S and W)	3/97			135

SILK.—Continued.

	Date of Starting.	Number of Employees.	Spindles.	Looms.
NEW JERSEY—continued.				
Paterson. Egberts Bros., 93 River St. Broad and dress silks.				8
Paterson. Franklin Silk Co., 33rd St. and 19th Ave. Novelty silks				10
Paterson. Grenker & Hancox. Broomhead Mill. Ribbons, hat bands				
Paterson. Knickerbocker Silk Co. $30,000. Dale St. and Grant Ave. H. C. Wade, president. J. H. Valentine, treasurer. Broad silk dress goods, etc. (S)				70
Paterson. New Jersey Silk Co. $26,000. Emil Goldsmith, president. C. Goldsmith, secretary and treasurer. Broad silks				65
Paterson. Stern, Pohly & Herrman. Broad silks. Market and Jersey Sts. Leased old Cooke Locomotive Works. (S)	10/97			150
Paterson. Geo. W. Wicke. Haledon Silk Mills. Labels and narrow ribbons		60		27
Pompton Lakes. German Artistic Weaving Co. (274 Church St., New York City.) New building. President and treasurer, A. C. Cluge. Superintendent, J. A. Gilfillan. 24 large double ribbon looms. (W)	12/97	50		24
NEW YORK.				
Canisteo. American Silk Lace Co. Silk velvets. E. Brown and Herman E. Buck	1/98			
Port Jervis. Duffy Bros. (also at Ft. Plain, N. Y.). Remodelled old building and built new building, 100x30, 2 stories. (W)	1/97	200		
Watertown. Elwood Silk Mfg. Co. B. H. Elwood, president. E. E. Elwood, secretary, treasurer and superintendent. Dress silks. Machinery brought from their plant at Fort Plain, N. Y.	9/97	100		80
PENNSYLVANIA.				
Alburtis. Hartley Silk Mfg. Co., from Middletown, N. Y. (S)	8/97			
Allentown. Weilbacher Bros. Ribbons. (S)	12/97	400		
Bath. Hughes & Co. Broad silks, ties and linings. 130x46, 2 story. (S)	12/97			
Carbondale. Klots Throwing Co., from New York				
Carlisle. Pennsylvania Silk Co. $50,000. W. G. Collins, president. Adolph Staples, superintendent. (S)	6/97			150
Catasauqua. D. G. Dery, Race St. Dress and tie silks. Also at Paterson, N. J.	1/98	100		100
Columbia. Ashley & Bailey Co. Other mills at Marietta, Pa., and Paterson, N. J. (S)	10/97	200		
Ephrata. Westerhoff Bros. & Napier (from Paterson, N. J.).	2/97			
Fleetwood. Pennsylvania Silk Co. Dress and taffeta silks. (Also at Carlisle, Pa.). (S)	2/97			100
Freeland. Freeland Silk Mills Co. $30,000. E. R. Simpson, president. F. W. Bleckley, treasurer. Throwsters			7,000	
Lancaster. Stehli & Co. (from Switzerland). New building under construction, 45x307, 3 story	3/98			
Lehighton. Eugene W. Bauer & Co. Hard silks. (From Paterson, N. J.). (S)	11/97	100		
Marietta. Ashley & Bailey Co. (Also at Paterson, N. J. and Columbia, Pa.)	10/97	200		
New Holland. New Holland Silk Co. New building 150x75. J. R. Frame, proprietor. Smaller mill started, Autumn '96.	1/98			
Philadelphia. C. E. Brown Mfg. Co. American and Diamond Sts. John Best, manager. Fancy woven labels...				14
Plymouth. Atwood Silk Co. J. Atwood. Located in old Roxburgh Mill			10,000	
Pottstown. Champion Silk Co. $40,000. In old Bannockburn Mill	12/97	200		
Quakertown. Eagle Silk Co. (Also in New York City.) New building 125x45, 2 story. (S)	1/98			
Scranton. Levy Bros. (Also Paterson and New York City.) Silk ribbons	1/98			
Scranton. Rieling, David & Schoen. (Also at Weehauken, N. J.) Under construction. (S)	6/98	350		
Taylor. Lackawanna Silk Co., Ltd. President, Joseph Hannick; treasurer, P. Londiquack; superintendent, L. W. Ramsay; manager, H. Pin		40		22
Titusville. Chas. Horn Silk Co. $60,000. Moved from New York City				

KNIT.—Continued.

	Date of Starting.	Number of Employees.	No. Ktg. Mchs.
PENNSYLVANIA—continued.			
Philadelphia. Charmwood Hosiery Mills, cor. Lehigh Ave. and Mascher St. Full fashioned half hose			
Philadelphia. Samuel Bramwell, 5339 Puliski Ave., Germantown. 8 ribbers; 2 loopers	6/97		8
Philadelphia. Oriental Knitting & Mfg. Co. $30,000. Howard and Harrison Sts. Frank Clewly, president. P. J. Courtney, treasurer. Fancy knit goods	5/97		
Philadelphia. Schwartz Hosiery Co, 444 Sixth Ave.			
Phoenixville. Lewis Parsons. Operates plant formerly occupied by Byrne, Parson & Co., who built new plant. Hosiery			
Pottstown. Fritz and Krouse. Misses' hose and half hose. Branch of their Royersford mill. (Gas engine.)	9/97		40
Reading. Kuersten & Rick, 222 Cedar St. Seamless hosiery			100
Reading. Jackson & Wm. De Hart, 2nd and Buttonwood Sts. Hosiery	11/97	50	
Reading. Weber & Paxson. Keystone Knitting Mills, 217 Church St. Seamless hosiery			10
Spring City. Chester Knitting Co. Jas. and Wm. H. Rogers. Jersey ribbed underwear			
Union Deposit. A. N. Kuhn. Hosiery	11/97		
Wilkesbarre. Yaple & Zimmerman. Fine seamless half hose. (S)	1/98	30	25
York. York Knitting Mills. Henry E. Field, Fred R. Chase, Morris L. Kalbach. Seamless hosiery. (S)	1/98	250	200
SOUTH CAROLINA.			
Beaufort. Beaufort Knitting Mill Co. $20,000. Hosiery. (W)	5/97		40
Columbia. J. M. Graham. Moved from Hopkins, S. C.			75
Manning. W. Scott Harvin. $10,000. Men's, ladies' and misses' hosiery			25
TENNESSEE.			
Lenoir City. Dixie Mills. $10,000. Men's and ladies' cotton hose. (S W D)	5/97	25	20
Nashville. Lakeshore Knitting Co. Jacob May, manager, 119 Belmont Ave. Men's, women's and children's cotton and wool hosiery. Buys yarn. (S D)	3/97		200
VERMONT.			
Jonesville. Baker Underwear Co. Branch of Peekskill, N. Y. R. J. Robinson, manager. Children's underwear	9/97	50	
Lyndonville. Lyndonville Knitting Co. $10,000. L. B. Harris, manager. (E)	1/98	25	
WISCONSIN.			
Milwaukee. Milwaukee Hosiery Mills, 19th and Lloyd Sts. $10,000. H. H. Schwarting, president. H. H. Rice, secretary. Geo. Geil, treasurer. Gloves, mittens, hosiery and socks			
Stevens' Point. H. S. Blake & Co. (Also at Racine, Wis.) Ladies' hose	1/98	45	40

SILK.

	Date of Starting.	Number of Employees.	Spindles.	Looms.
CONNECTICUT.				
Middletown. Portland Silk Co. James Miller. Silk. Moved from Passaic, N. J.	10/97			
Mystic. Rossie Velvet Co., of Suechtein, Prussia, care Wm. Openhym & Sons, 42 Greene St., New York City. Silk velvets	2/98	100		
Shelton. A. & S. Blumenthal, 210 W. 89 St., New York City. Silk, velvet, plush. Under construction		150		
Yalesville. Armstrong Braiding Co. $15,000. A. H. Armstrong, president. H. L. Harding, secretary and treasurer. Silk and mohair braids.				
NEW JERSEY.				
Athenia. A. W. Pierson & Co., of Southport, England. Silks and Plushes. Machinery from England	1/98	500		
Paterson. Baker & Schofield Co. $25,000				
Paterson. Capella Silk Co. J. C. Nightingale. $10,000				
Paterson. Miller & Ward, cor. Paterson and Harrison Sts. Broad silks	10/97	40		32
Paterson. Cardinal Silk Co. $30,000. A. Cardinal, president. R. H. Matthies, treasurer. Dress silks, linings, etc. (S and W)	3/97			135

SILK.—Continued.

	Date of Starting.	Number of Employees.	Spindles.	Looms.
NEW JERSEY—continued.				
Paterson. Egberts Bros., 93 River St. Broad and dress silks.				8
Paterson. Franklin Silk Co., 33rd St. and 19th Ave. Novelty silks				10
Paterson. Grenker & Hancox. Broomhead Mill. Ribbons, hat bands				
Paterson. Knickerbocker Silk Co. $30,000. Dale St. and Grant Ave. H. C. Wade, president. J. H. Valentine, treasurer. Broad silk dress goods, etc. (S)				70
Paterson. New Jersey Silk Co. $26,000. Emil Goldsmith, president. C. Goldsmith, secretary and treasurer. Broad silks				65
Paterson. Stern, Pohly & Herrman. Broad silks. Market and Jersey Sts. Leased old Cooke Locomotive Works. (S)	10/97			150
Paterson. Geo. W. Wicke. Haledon Silk Mills. Labels and narrow ribbons		60		27
Pompton Lakes. German Artistic Weaving Co. (274 Church St., New York City.) New building. President and treasurer, A. C. Cluge. Superintendent, J. A. Gilfillan. 24 large double ribbon looms. (W)	12/97	50		24
NEW YORK.				
Canisteo. American Silk Lace Co. Silk velvets. E. Brown and Herman E. Buck	1/98			
Port Jervis. Duffy Bros. (also at Ft. Plain, N. Y.). Remodelled old building and built new building, 100x30, 2 stories. (W)	1/97	200		
Watertown. Elwood Silk Mfg. Co. B. H. Elwood, president. E. E. Elwood, secretary, treasurer and superintendent. Dress silks. Machinery brought from their plant at Fort Plain, N. Y.	9/97	100		80
PENNSYLVANIA.				
Alburtis. Hartley Silk Mfg. Co., from Middletown, N. Y. (S)	8/97			
Allentown. Weilbacher Bros. Ribbons. (S)	12/97	400		
Bath. Hughes & Co. Broad silks, ties and linings. 130x46, 2 story. (S)	12/97			
Carbondale. Klots Throwing Co., from New York				
Carlisle. Pennsylvania Silk Co. $50,000. W. G. Collins, president. Adolph Staples, superintendent. (S)	6/97			150
Catasauqua. D. G. Dery, Race St. Dress and tie silks. Also at Paterson, N. J.	1/98	100		100
Columbia. Ashley & Bailey Co. Other mills at Marietta, Pa., and Paterson, N. J. (S)	10/97	200		
Ephrata. Westerhoff Bros. & Napier (from Paterson, N. J.).	2/97			
Fleetwood. Pennsylvania Silk Co. Dress and taffeta silks. (Also at Carlisle, Pa.). (S)	2/97			100
Freeland. Freeland Silk Mills Co. $30,000. E. R. Simpson, president. F. W. Bleckley, treasurer. Throwsters			7,000	
Lancaster. Stehli & Co. (from Switzerland). New building under construction, 45x307, 3 story	3/98			
Lehighton. Eugene W. Bauer & Co. Hard silks. (From Paterson, N. J.). (S)	11/97	100		
Marietta. Ashley & Bailey Co. (Also at Paterson, N. J. and Columbia, Pa.)	10/97	200		
New Holland. New Holland Silk Co. New building 150x75. J. R. Frame, proprietor. Smaller mill started, Autumn '96.	1/98			
Philadelphia. C. E. Brown Mfg. Co. American and Diamond Sts. John Best, manager. Fancy woven labels...				14
Plymouth. Atwood Silk Co. J. Atwood. Located in old Roxburgh Mill			10,000	
Pottstown. Champion Silk Co. $40,000. In old Bannockburn Mill	12/97	200		
Quakertown. Eagle Silk Co. (Also in New York City.) New building 125x45, 2 story. (S)	1/98			
Scranton. Levy Bros. (Also Paterson and New York City.) Silk ribbons	1/98			
Scranton. Rieling, David & Schoen. (Also at Weehauken, N. J.) Under construction. (S)	6/98	350		
Taylor. Lackawanna Silk Co., Ltd. President, Joseph Hannick; treasurer, P. Londiquack; superintendent, L. W. Ramsay; manager, H. Pin		40		22
Titusville. Chas. Horn Silk Co. $60,000. Moved from New York City				

MISCELLANEOUS.

	Date of Starting.	Number of Employees.	Spindles.	Looms.
DELAWARE.				
Wilmington. Brandywine Dye Works. $20,000. Cotton hosiery and yarns. 909 Lancaster Ave. 3,300 lbs. a day. A. S. Reed, president. E. Mitcheltin, treasurer				
Wilmington. New mill built by Wilmington Industrial Improvement Co., at 13th and Poplan Sts. Name of lessee not yet known. Under construction		125		
IOWA.				
Decorah. American Linen & Fibre Co. $500,000. President, A. C. Place. Treasurer, Phil. Allen, Jr. Superintendent, Jas. E. Lappen. Linen fibre from flax strand, a substitute for cotton warps		12		
KENTUCKY.				
Louisville. Ohio Falls Dye & Finishing Works. $20,000. President, John E. Norris. Treasurer, E. Galatti. General manager, Wm. B. Nanson. (S D)	9/97	35		
MINNESOTA.				
St. Paul Park. Union Mills Co. Crash towels and suitings. W. C. Youngman, New York and Andrew McLean, Passaic, N. J., interested. New system of manufacture, in experimental stage. (S)	10/97	50	480	20
NEW HAMPSHIRE.				
Meredith. American Flax Mfg. Co. $150,000. J. Minot Hall, president. Benj. F. Bates, treasurer. Flax fibre and coarse linen yarn. (W)				
No. Salem. John Slack. Hair cloth	7/97	15		4
NEW JERSEY.				
Paterson. Greenwood Dyeing Co. Cotton and worsted yarns. 161 Marshall St.				
NORTH CAROLINA.				
Tarboro. Tarboro Dye Works. F. Morganstein, proprietor. Emil Forthuber, manager. Specialty fast black on cotton hosiery yarns. (S)		15		
PENNSYLVANIA.				
Philadelphia. Dexter Dye & Carbonizing Works. Refitted old Dexter Dye Works, Main St., Manayunk				
Philadelphia. Chas. Techner & Co., Amber St. and Allegheny Ave. Skein silk dyeing	1/98			
Philadelphia. Industrial Dyeing & Finishing Works, 3829 Frankford Ave. $200,000. Consolidation of the Standard Finishing Works and the World Dyeing & Finishing Works		50		
Philadelphia. Philadelphia Linen Co. $25,000. Cor. American and Diamond Sts. Jas. Akopp, president. Chas. Prettyman, treasurer	2/97	25		100
RHODE ISLAND.				
Pawtucket. French Hair Cloth Co., East Ave. $100,000				

PROJECTED INDUSTRIES.

Under this head are enumerated such projects as are now in course of construction, or which in all probabilities soon will be, but which are not sufficiently far advanced to be properly included in the list of new mills.

COTTON.

ALABAMA.

Greenville. Wellchester Mills. Proposed Jan. '97, by R. Y. Porter, J. H. Dunklin and others.

Selma. Selma Cotton Mill Co. Propose to double capacity.

Thomasville. Magnolia Mfg. Co. (H. (M. Mathis.) $150,000. Company not yet organized. 10,000 spindles.

GEORGIA.

Chickamauga. Cotton mill. C. E. Buck, projector. Site near Crawfish Springs.

Dublin. Cotton mill. Capt. R. C. Henry interested.

Elberton. $200,000 mill. H. K. Gaudner interested.

Rome. New York Mills of N. Y. Mills, N. Y. May build 15,000 spindle plant near here.

NORTH CAROLINA.

Durham. Spinning mill. 8,000-10,000 spindles. Hosiery yarns. J. S. Carr interested.

McAdenville. Catawba River Cotton Mill. Projected last year. J. H. McAden, Charlotte. 10,000 spindles. 400 Northrop looms.

SOUTH CAROLINA.

Columbia. Elmwood Mfg. Co. R. J. Palmer, president; M. J. Johnson, treasurer; A. W. Montieth, general manager. To operate new mill with negro operatives. In old Congaree mill.

Seneca. Seneca Mfg. Co. $300,000. Prints. Projected, but nothing done since Jan. '97.

TEXAS.

Corsicana. Corsicana Cotton Mills Co. R. A. High and others interested.

TEXAS—continued.
Lodi. Cotton mill. $50,000. W. H. Erambert, W. C. Jones and S. Hooper interested.
Weatherford. Cotton mill. $100,000. W. S. Fant, cashier First National Bank, and others interested. Stock not yet subscribed.

VIRGINIA.
Portsmouth. Southeastern Extension Cotton Mill Co. Chas. Adamson, treasurer, Cedartown, Ga. Incorporated. Mill projected for site near Gilmerton, Va. 50,000 spindles.

WOOLEN.

MAINE.
Norway. Smiley Mfg. Co. Electric Power from Oxford El. Lt. Co. Cloth.

MASSACHUSETTS.
Webster. Beaver Brook Woolen Mill Co. Projector, Wm. C. Hall, 24 Walker Bldg., Worcester. Expect to start April 1, 1898. 40 looms.

MICHIGAN.
Detroit. Glasgow Woolen Mills Co. $15,000, (incorporated Dec. 1897. Wm. C. Loftus, New York; J. J. Hartigan and Frank Rockford, Detroit.
Sault Ste Marie. J. G. Griffith, of Pickford, Mich. New mill corner Canal and Magazine Sts.

PENNSYLVANIA.
Hulmerville. Frederick Rumpf and Son, (Third and Cumberland Sts., Philadelphia). Plans by Archts. J. F. Stuckert and Son, 49 No. 13th St., Phila., call for bldg. 30x100, 3 story, steam power. To be built in spring 1898, probably.
Reading. T. & J. Tinker, (from No. Huddersfield, Eng.). Worsted goods.
Scranton. MacElroy & Scholes. New bldg. 50x200 and equipment. Also Proprs. Gothic Mills, Philadelphia. May build in spring 1898.

RHODE ISLAND.
Providence. Crown Worsted Mill. Bought lot on Troy St. and will build mill.

KNIT.

ALABAMA.
Decatur. Knitting mill. $16,000. J. T. Banks and others.

GEORGIA.
Macon. Weeks Mfg. Co. $50,000. Hosiery and underwear. C. H. Weeks, J. Pate Stetson, C. M. Boifeuillet, incorporators.
Rossville. Richmond Hosiery Mill, formerly the Chattanooga Knitting Mill, to build large plant here. Capital stock, $50,000. E. G. Richmond, pres; Garnett Andrews, Jr., treas.

NEW HAMPSHIRE.
Lakeport. C. E. & J. J. Leavitt. Hosiery mill.

NEW YORK.
Buffalo. Miss Annie Winter, 5 E. Genesee St. Contemplates making ladies' hose and underwear.

PENNSYLVANIA.
Harrisburg. P. H. Lamey & W. H. Sheafer, 3900 Walnut St., Wiconisco, and others. 30x60. 2 story. Hosiery Probably start early in 1898.
Tremont. Francis Romberger. Hosiery.

SILK.

NEW JERSEY.
Lodi. Henry W. Boettger bought Lodi Print Works property. Reported to build silk factory within 6 mos. Employing 500.

NEW YORK.
Olean. Reliable Silk Mfg. Co., negotiating for the removal of their plant from Fort Jervis, N. Y.
Unionville. Toner & Prescott. To start in Jan. 1898 on enlargement. 72x48. 2 story for 18 looms. 25 hands.

IMPORTANT ENLARGEMENTS AND IMPROVEMENTS.

COTTON.

ALABAMA.
Piedmont. Coosa Mfg. Co. Bought and added the mchy of the Barlow and Thatcher Spinning Co. Henry Clay Factory, Del.
Tuscaloosa. J. Snow Hardware Co. 80 new looms.

CONNECTICUT.
Grosvenordale. Grosvenordale Mfg. Co. Mill No. 1. Addition of 8,000 spindles, 300 looms.
No. Grosvenordale. Grosvenordale Mill No. 2. 10,000 spindles, 136 looms.
Middletown. Russell Mfg. Co. Addition of brick Bldg., 136x48, 2 story.
Moosup. Aldrich Mfg. Co. 50 machines for making braid.
Putnam. Putnam Mfg. Co. 13,240 new spindles. 432 new looms.
Taftville. Ponemah Mills. New bldg.
Versailles. Uncasville Cotton Co., of Uncasville, Ct., bought old Versailles Mills. To start about Jan. 98.

GEORGIA.
Augusta. Sibley Mfg. Co. Addition. 500 new looms.
Augusta. John P. King Mfg. Co. Addition 20,096 cotton spindles, 600 loom. Total cost of addition $300,000.
Augusta. Clark & Co. Globe Cotton Mills. Addition 1,000 spindles.
Cedartown. Cedartown Cotton Mfg. Co. Addition 7,500 spindles.
Whitehall. Georgia Mfg. Co. Installed electric power. Added 3,328 spindles.

MARYLAND.

Harve de Grace. M. Gambrill & Co. Fine cotton goods. Built new mill to take place of old plant at Bank, Md.

MASSACHUSETTS.

Lancaster. Lancaster Mfg. Co. Addition under construction. 50 employees.

Methuen. Methuen Co. Addition for dye house.

Millbury. Cordis Mill. Dye house and storehouse.

Webster. H. N. Slater. Additional bldg. and 700 looms.

Westfield. Wm. Warren Thread Co. Addition 65x40. 2 story.

NEW HAMPSHIRE.

Claremont. Monadnock Mills. Added 80 looms.

East Jaffrey. N. D. White & Sons. Addition to cost $50,000. 125 new looms. 100 more employees.

Nashua. Jackson Co. New bldg to replace Mill No. 2, will have double old capacity, i. e., 255 looms.

NEW JERSEY.

Camden. Camden Curtain & Embroidery Co. Additional bldg. 60x100. 4 story. Employing 200. Started Dec. 1897.

NEW YORK.

Lansingburgh. Wm. H. Draper & Son. Fish lines, twines and window cords. Addition to double production. Start about Jan. 1898.

NORTH CAROLINA.

Charlotte. Ada Mfg. Co. Addition 50x75 with 1536 twister spindles.

China Grove. Paterson Mfg. Co. 4,000 new spindles.

Dallas. Dallas Cotton Mills. Addition 56 looms.

Double Shoals. Double Shoals Cotton Mills. Addition of dye house.

Forest City. Florence Mills. Controlled by Henrietta Mills, N. C. Addition 12,000 spindles, 400 looms.

Gastonia. Avon Cotton Mill. Addition 5,000 spindles.

Gastonia. Modena Cotton Mill. Replaced 44 looms with 2064 spindles.

Graham. Oneida Cotton Mills. Addition 4,000 spindles.

Henrietta. Henrietta Cotton Mills Added 300 looms and 2,100 spindles.

Hope Mills. Hope Mills Mfg. Co. 60 looms.

Huntersville. Anchor Mills. Successors to the Virgin Cotton Mills. $50,000 capital.

Lowell. Spencer Mountain Mills will add by Feb. 1898, 2,000 spindles which are ordered.

Worthville. Worth Mfg. Co. Addition 25 looms, 800 spindles.

PENNSYLVANIA.

Chester. Chester Mfg. Co. Addition 50x100. 60 looms.

Philadelphia. Delph Spinning Co., Clearfield & C Sts., new weave shed 24x150. 1 story.

RHODE ISLAND.

Pawtucket. New England Thread Co. Additional equipment to double capacity.

Pawtucket. Royal Weaving Co. New bldg. 324x77. 4 story. Cotton, wool and silk goods. 100 employees, 300 looms. Under construction.

SOUTH CAROLINA.

Anderson. Anderson Cotton Mills. Addition 18,000 spindles and 600 looms. Capital stock doubled to $500,000.

Bath. Aiken Mfg. Co. Added 12,000 spindles, 312 looms.

Clinton. Clinton Cotton Mills. Added 6,000 spindles, 154 looms. Increased capital stock from $100,000 to $150,000.

Columbia. Granby Cotton Mills. Added 3,500 spindles.

Greenville. F. W. Poe Mfg. Co. Added 15,000 spindles and 304 looms.

Greer Depot. Victor Mfg. Co. Increased capital stock, $150,000 to $200,00 and added 100 looms.

McColl. McColl Mfg. Co. Added machinery for making rope.

Union. Union Cotton Mills. Added 30,000 spindles and 900 looms.

Yorkville. Yorkville Cotton Mills started in May 1897 and since added 2,500 spindles and 1,200 twisters.

VIRGINIA.

Danville. Riverside Cotton Mills. Enlargement of dye house.

WISCONSIN.

Janesville. Rock River Cotton Co. Added machinery for making wrapping twine. 1,000 twister spindles.

WOOLEN.

CONNECTICUT.

Baltic. Shetucket Worsted Mills. Additions.

Mechanicsville. French River Textile Co. $100,000. New company organized to operate the Mechanicsville Mills. F. A. Sayles, John Simson, J. P. Kirkaldy interested.

Stafford Springs. Central Woolen Co. New spinning machinery.

ILLINOIS.

Aurora. Aurora Bleachery & Dye Works. Addition of dye house, 52x32.

Mishawaka. Mishawaka Woolen Mfg. Co. Addition for making rubbers for their woolen goods.

MAINE.

Lewiston. Lincoln Mill. Libbey & Dingley, proprietors, was formerly cotton mill. Nov. 1897 put in 1 set 60 inch cards. 20 looms.

Newport. Newport Woolen Co. Addition 75x150. 2 story. 6 new looms, new picker and drying machinery.

Rumford Falls. Noone-Minchin Co., formerly Rumford Falls Woolen Co. Chas. H. Noone, president; Samuel F. Train, treasurer; A. O. Sawyer, supt. Now making patent improved laundry cloth, a fabric with linen face and wool backing for laundry rolls. Started Aug. 1897.

Wilton. F. J. Goodspeed. Wilton W. Mills. Addition, new cards and mules and looms.

MASSACHUSETTS.

Blackstone. Chas. Fletcher has bought the Waterford Mills property and will make worsted yarns and cloth.

Caryville. Taft, Murdock & Co. Addition 120x26 for picker room and weave room.

Dalton. Hampden Woolen Mills leased the Glennon Mill and moved plant from Hampden, Mass. Added new picker and boiler houses. Started Sept. 1897. Employ 200.

E. Brookfield. Winfield Scott & Co. Satinets. Added 16 looms, 1 set cards, 20 new hands.

Franklin. Waite Felting Co. 7 new sets cards.

Holliston. E. M. Rockwell of Leominster leased and started up the Holliston Woolen Mills.

Lawrence. Crescent Worsted Co. Addition to double production, under construction, will start Feb. 1898, employing 40.

MASSACHUSETTS—continued.
Lowell. Lowell Mfg. Co. Axminster carpets. New weave shed.
Lowell. Mass. Mohair Plush Co. 3 story bldg. on Western Ave. Containing 800 spindles and employing 30 hands.
Millbury. Mayo Woolen Co. E. B. Mayo, Thomas C. Curtis. Bought Lapham Mills and refitted for producing worsted goods.
No. Andover. Brightwood Mfg. Co. Addition with 8 new looms.
Pittsfield. Pontoosuc Woolen Mfg. Co. Added new building, 150x58, 2 story. 3 new sets and spinning.
Plymouth. Standish Worsted Co. New weave shed for 50 new looms.

NEW HAMPSHIRE.
Goff's Falls. Devonshire Mills. New bldg. for old machinery and some new machinery.
Gonic. Gonic Mfg. Co. Large new dye house and equipment.
No. Salem. W. H. Hanson. Added worsted machinery.
Tilton. Hart, McArthur & Hart, of Ashland, N. H. bought, in Sept. 1897, the Geo. E. Buell mill and expect to start on yarns.

NEW JERSEY.
Camden. Philadelphia Worsted Co. Moved from Philadelphia to cor. Point and Erie St., Camden, N. J. Jan. 1, 1898. Added new machinery.
Somerville. Somerville Woolen Mills new washing and scouring bldg. near Pluckemin, and new machinery for same.

NEW YORK.
Jamestown. Empire Worsted Mills. New bldg, 120x200, 4 story, to nearly double output. Capital increased from $100,000 to $250,000. 36 new looms, start Jan. 1898.
Lestershire. Faatz Brush & Felting Co. Addition 44x100, 4 story. For felt making. 8 sets. Started Dec. 1897.
Newburgh. Crabtree & Patchett. Worsted yarns. Branch of Montgomery, N. Y. 2000 spindles. Started July, 1897.

OHIO.
Minster. Drece, Bensman & Laffar bought 2 set mill of John Elting, and fitted up to run on Cassimeres and flannels.

PENNSYLVANIA.
Bristol. W. H. Grundy & Co. Large addition, costing $75,000.
Chester. Byram Mfg. Co. Added 55 looms.
Millersburg. Geo. W. Kline Co. Rag and jute carpets. Addition.
Philadelphia. Thomas Boggs. Carpets. 2nd St. & Allegheny Ave. New bldg. 55x200.
Philadelphia. Thos. Caves & Sons. Velvet carpets. Formerly the Canton Mills, Manayunk, now called Keystone Mills. Employs 200.
Philadelphia. Hirst & Rogers will move to a larger mill at Allegheny and Kensington Aves. by Feb. 1, 1898 and add 15 looms.
Philadelphia. John M. Schwehm (also at 1824 Manor St.). New mill 13-15 Wistar St., Germantown. 132 looms. Steam. Dye house.
Philadelphia. Wm. F. Read. Victoria Mill. Addition 39x70. So. 12th and Jackson Sts.
Philadelphia. C. H. Masland & Sons, Amber and Westmoreland Sts. Addition 110x52 4 story and bought 44 looms and entire equipment of L. C. Krisher, carpet mfgr.
Philadelphia. Joseph H. Bromley, 4th and Lehigh Ave. Addition to carpet mill.

RHODE ISLAND.
Bridgeton. Sam'l Mellor moved machinery from Stone Worsted Mill, Pascoag, R. I., to Clear River woolen mill. Total 60 looms.
Bristol. Cranston Worsted Mills added 1 set cards and combing machinery.
Central Falls. Farwell Worsted Mills. Addition containing 4 sets cards. 75 looms.
Providence. Galvin Yarn Co. Addition for 3 sets cards.
Washington Livingston Woolen Mills. Joseph Dews and others. $50,000. Formerly the Washington mill. Equipped with new machinery.
Woonsocket. Woonsocket Worsted Co. Added 2 sets cards.
Woonsocket. Simson & Kirkaldy. New dye house.

VIRGINIA.
Salem. Holstein Woolen Co. Added 1 set cards and 10 looms.

WASHINGTON.
Kirkland. Seattle Woolen Mfg. Co. Increased capacity.

WISCONSIN.
Prairie du Chien. Prairie du Chien Woolen Mill Co. Added 1 set cards and 2 looms and new power plant.

KNIT.

CONNECTICUT.
Plainville. Plainville Mfg. Co. New picker house.
Somers. J. E. Fenner bought the W. W. Kentworthy warp mill and moved his Hebron plant here and put in new knitting machinery.
Winsted. New England Knitting Co. New 3 story mill, dye house and steam plant.

GEORGIA.
Athens. Athens Knitting Mill. Addition of 6 knitting machines.
Barnesville. Stafford-Huguley Hosiery Co. 15 new knitting machines.

INDIANA.
Fort Wayne. Wayne Knitting Mills. Enlarged 50 per cent.

MARYLAND.
Frederick. Union Mfg. Co. 70 knitting machines and 15 ribbers.
Hagerstown. Windsor Knitting Mills. Addition of 66 knitting machines.

MASSACHUSETTS.
Farley. Orange Knitting Co. Addition.
Highlandville. Wm. Carter & Co. Additional machinery.
Hinsdale. Hinsdale Woolen Co. Leased another mill to increase their product.
Wakefield. Winship, Boit & Co. Move into new building Jan. 1st, '98.

NEW HAMPSHIRE.
Laconia. Estey Hosiery Co., successors to Laconia Mfg. Co. New mill and equipment. 200 knitting machines. Buy yarn. Start Jan., '98.

NEW JERSEY.
Paterson. Post & Sheldon Knitting Co. Moved into new building Oct. '97. Added 45 looms.

NEW YORK.
Capron. Capron Knitting Co. Increased capital from $10,000 to $75,000, and built large addition.
Hagaman's Mills. Anchor Knitting Mills. Addition. Capacity doubled.

NEY YORK—continued.

Oriskany Falls. Oriskany Falls Knitting Co. New addition 45x100, 3 story. Capital increased from $25,000 to $75,000. Start Jan. '98.

Oswego. Frederic Conde. Addition 40x60, 3 story. Started Jan. 98. Addition employs 150.

Rockton. Eagle Knitting Co. Rented Red Star Knitting Mills and will operate same Jan. '98, employing 120 hands.

NORTH CAROLINA.

New Berne. Clemont Mills. Moved to large building and added 30 knitting machines.

Salisbury. Salisbury Hosiery Mills. Reorganized from Rowan Knitting Co. Added 10 knitting machines.

Scotland Neck. Scotland Neck Cotton Mills. Add 50 knitting machines.

PENNSYLVANIA.

Chambersburg. Chambersburg Hosiery Co. 10 knitting machines added.

Nazareth. Nazareth Mfg. Co. Addition 40x100, 3 story.

Newville. Newville Knitting Co. Addition 58 knitting machines.

Philadelphia. E. Sutro & Son Co. Moved to larger new building at Thompson and Division Sts.

Philadelphia. J. H. Crossingham, 57 Armat St., Germantown. Added 10 knitting machines.

Philadelphia. Thos. West. Wyoming Valley Knitting Mill. Added 50 knitting machines.

Reading. Nolde & Horst, 820 Moss St. Addition 165x33, 3 story.

Royersford. Fritz & Krause. Royersford Hosiery Mill. Added 15 knitting machines.

Wiconisco. Kemmel & Mossop. Addition 50 knitting machines.

SOUTH CAROLINA.

Charleston. Charleston Knitting Mills. Reorganized. Added new machinery and dyeing plant.

Spartanburg. Spartanburg Knitting Mills. Added 18 knitting machines and other machinery.

Union. Excelsior Knitting Mills. Added dyeing equipment.

TENNESSEE.

Knoxville. Knoxville Knitting Mills Co. Added 20 knitting machines.

SILK.

CONNECTICUT.

Willimantic. Moosehead Silk Co. Started branch at Gurleyville, making enamelled and water proof silk fish lines, braids and glove cords.

NEW JERSEY.

Lake View. Eastwood & White. 2 story addition. Nearly double their capacity.

Lake View. John Hand & Sons. Addition of finishing room.

Paterson. Capella Silk Co., formerly Joseph Nightingale. Built new mill 50x100.

NEW YORK.

New York. Liberty Silk Co., 548 W. 57th St. Addition of 80 looms. 75 new hands. Start Jan. 15th, '98.

PENNSYLVANIA.

Allentown. Palace Ribbon Mfg. Co. Addition 50x50, 3 story.

Allentown. Givernaud Bros. Additional looms.

Altoona. Schwarzenbach, Uber & Co. Addition employing 100.

Williamsport. John N. Stearns & Co. Added weave room 219x127, 1 story.

Wilkesbarre. Hess, Goldsmith & Co. Moved 300 looms from their Paterson, N. J., mill.

MISCELLANEOUS.

GEORGIA.

West Point. Lanett Bleachery & Dye Works. Addition 100x78, 2 story.

MARYLAND.

Baltimore. Schneider & Wachter. Maryland Bleach & Dye Works, 2005 Hudson St. New equipment to increase capacity.

MASSACHUSETTS.

No. Adams. Windsor Co. Print Works. New finishing room 60x40, and warehouse 110x65.

Plymouth. Plymouth Cordage Co. Addition 36x90, and large storehouse.

Webster. Stevens Linen Works. New bleach house.

NEW YORK.

Auburn. Columbian Cordage Co. Addition to increase production.

Frankfort. Frankfort Linen Mfg. Co. Capital increased from $50,000 to $75,000. 50 looms added, doubling output.

PENNSYLVANIA.

Philadelphia. D. Harvey & Son. Janney St. Finishers. Addition 18x70, 4 story.

RHODE ISLAND.

Providence. Providence Dyeing, Bleaching & Calendering Co. Addition.

TEXAS.

Galveston. Galveston Rope Co. (Jute.) Capacity increased 25 per cent.

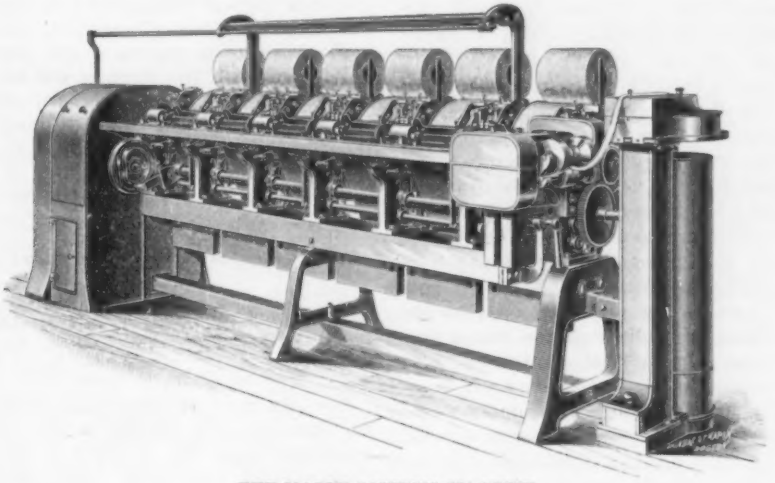
The Mason Combing Machine.

MADE BY THE MASON MACHINE WORKS, TAUNTON, MASS.

We have the pleasure of illustrating, herewith, the first successful American cotton combing machine, which has been used by a number of mills with the greatest degree of satisfaction, as we know from personal visits upon those who are running it. The machine is a credit to American enterprise and workmanship, every part being nicely finished and adjusted. A feature strongly recommending the machine is its great rigidity and strength of the driving parts, which allow the closest settings, thus assuring the best and finest work. The means that have been adopted for obtaining the extra rigidity and strength, serve, also, to facilitate the encasing of the driving gearing (seen at the left in the illustration); which, in obviating frequent stoppage for cleaning, increases the productive capacity of the machine. These advantages, taken with the best material, appliances and workmanship obtainable, justify the makers in claiming that this machine is, at least, unsurpassed at the present day, and this claim is corroborated by those that we have seen using it.

Six is the usual number of heads to a comber, but the makers also put on four or eight heads, as may be desired; but, on the longer machines, the nipping and detaching cams (seen in the illustration at the left) are preferably placed in the middle of the beam, thus obviating any torsion which might occur in the shafts driven by these cams. This machine is made to use laps of any usual width, cotton of any staple, and can, if so desired, be furnished with a full-can stop motion.

The cylinders and top combs are needled by the makers of the machine. All the flutted segments and brass comb strips on the cylinders are interchangeable, a feature which will be appreciated by those using it. In designing this machine, there has been a noticeable departure from the usual construction of combers, in that the pulleys, cams, notch-wheel, feed gearing, etc., are not placed on the end of the beam and over-hanging it. Rather there is provided a head end, with separate support for all these motions, and this feature, in connection with the stronger parts employed throughout the machine, and the additional bearings that have been introduced, prevent the vibration prevalent in some machines of this description. All of the head gearing, cams, etc. are



THE MASON COMBING MACHINE.

encased in the head end (see illustration), reducing the opportunity for help getting caught in working parts, making the machine not only cleanly, but adding to its finished appearance.

By the employment of larger shafts, all torsion on the longer machines has been eliminated. The setting and adjusting screws are of a standard uniform size, and the ease of access to setting points has been carefully looked after. The dial plate is in full view at all times, so that the one in charge can at once see the adjustment of the machine. All cams and cam grooves are accurately finished, enabling the cam rolls to work smoothly and regularly. The notch-wheel is usually made with twenty teeth, but other sizes can be used if desired. By the interchangeable method of building up the half-laps, the cylinders always retain a true circle, concentric with the cylinder shaft. Comb strips and half-laps are interchangeable. The arrangement of the brushes, for cleaning the needles on the combing cylinder, is such that all wear of the bristles can be taken up. The brushes are so covered that objectionable fly is dispensed with.

Any further particulars can be obtained by addressing the Mason Machine Works, Taunton, Mass., also builders of revolving flat cards, drawing frames, spinning frames, mules and looms, in great variety.

—It seems now pretty conclusive that we shall have a cotton crop this season, of 10,500,000 bales. Estimates have been made ranging from 9,650,000, to 11,000,000 bales. Prices for this commodity are likely to continue below the cost of production long after the planting season for next year's crop, which will have a material influence, in our opinion, in deciding planters to curtail their cotton crop and devote it more to cereals.

—It may be interesting to note that cotton cloths have depreciated in value about 30 per cent., or to be more exact, 28.6 per cent., within the last seven years, as noted in the following quotations: October, 1890, standard brown sheetings, 4-yards brown sheetings, and standard brown drills, sold respectively at 6.65; 5.25; and 6.75c. per yard. In December, 1897, the prices of these goods were, respectively, 4.75; 3.75; and 4.75c. per yard. In regard to woolens, clay worsteds, 16 ounces, are in the neighborhood of 30 per cent. above the price ruling two years ago. The lowest price at which these goods sold within the last two years, was in March, 1897.

—It has been found that cotton when mercerized in a strongly stretched condition, and washed while still stretched, takes a silken gloss and acquires a greater strength. After the cotton yarn or cloth is subjected in a highly stretched condition to the action of dyes, the purpose being effected when the material takes a parchment-like appearance, it is washed while still stretched, "until the internal stresses existing in the fibre have ceased." On removal from the stretching apparatus it may then be dyed or otherwise treated without fear of shrinking.

[*Exclusively for the Textile World*]

Art as Applied to Every Day Life.

Paper read by Vesner L. George, of Boston Mass., before the Lowell Textile School, Lowell, Mass.

(Continued from December.)

The two most notable things about the Egyptian Art, are the originality manifested and the symbolism that characterized everything. They took the natural forms found in Egypt, especially the Nile, and, selecting them for their symbolic meaning, adapted them to the necessities of their decoration. The lotus, which was one of their commonest motives, grew in the waters of the Nile. The lily depended on the Nile for its presence and the Egyptians depended upon the rising of the river for their crops; so the presence of the lily was a sign of plenty to them. The Scarabaeus, or winged beetle, so common to them was an emblem of divinity. The winged globe was a talisman, or sign of good luck. The wings symbolized providence; the globe, the sun, and the two asps, dominion and monarchy. The whole

signified the creative, protective, and distributive powers. The Egyptians never used realistic or naturalistic treatment in their art. They chose to use the type of the thing rather than the thing itself.

This point is worth noticing, as the question is constantly arising as to whether or not it is good taste to use naturalistic treatment. But I will speak of that later.

Greek Art.—While this doubtless derived much of its foundation from the Egyptian, was most elegant and refined. Here, delicacy and refinement of treatment, careful study of proportion and infinite care produced an exquisite art, that is, to-day, a model of all that is best in architecture, sculpture and decoration. Notice, here again, we have the conventional treatment, the suggestion, rather than the thing itself. Even in their sculptures, they did not try to reproduce natural deformity for the sake of truth, and their statues were types of the very best, and idealized the forms they chose. The acanthus leaf is another familiar motive, although it is used in greater profusion in Roman Art.

Roman Art is a further development of the Greek, not, however, a higher development. The Romans made great scrolls and covered them lavishly with acanthus leaves. Indeed, scrolls heavily laden with acanthus leaves surrounding a rosette, have become a sign of recognition. This heavy ornamentation soon became monotonous. Their only originality was manifested in their development of the forms borrowed from others. They invented no new motives, consequently Roman Art soon began to deteriorate into the less attractive style known as the Romanesque. The arch is, perhaps, an exception to the above statement and is quite significant of that order. So much for Ancient Art.

Of the Mediæval period, the Byzantine comes first. This art was a religious and symbolic art in which the motives used by the Romans were adapted to the uses of the Christian church and interwoven with the emblems of their religion. The trefoil and quartrefoil, emblems of the Trinity, and the four evangelists; the cross and the serpent are commonly seen. The acanthus leaf is an ever present motive, although its treatment is so changed as to be scarcely recognizable being pointed, now, rather than rounded in its form.

The Saracenic Art illustrates a marked change in style. The Arabs had no decoration of their own, and could not have been other than astonished at the magnificence of the cities that fell into their hands, as conquerors, in the 7th century. They immediately appropriated the talent of the Byzantine artists, to build and decorate mosques and castles for themselves. The laws of their religion forbade, however, that they should use any natural forms, and so the ingenuity of the artist was taxed to create a style that should depend entirely upon geometric form and on color for its effect. The result was a delightful theme in diapers and interlacing with rich and gorgeous colors. Gold was used profusely and the decorations were worked much in relief with stucco. The Alhambra in Spain, built by the Moors, is an excellent example of this style.

The third of the Mediæval styles is the Gothic, which is practically a religious style, having grown out of the Christian Byzantine, and is best illustrated in the Cathedrals of Germany, France, and England. The arch, known as the Gothic arch, is a strong characteristic, although other forms are common. The trefoil and quartrefoil are also typical forms. Its exquisite window tracery, built on geometric forms, is a strong mark for recognition.

After a period of inactivity, art took a new life in the Renaissance. As the epidemic spread over all Europe at once, we have what is termed Italian Renaissance, French Renaissance, German Renaissance, etc. It was a revival of art and was, in its best development, an entirely æsthetic style. Here, natural forms were used, and flowers and fruits cut in bold and realistic relief. Elaboration and richness held sway. Foliage and tracery were used in profusion, animals and figures were also introduced. Much of the motive was meaningless. The laws of

balance and growth were at first ignored, and it was not until the influence of Greek art was brought to bear upon this style, that it became transformed into a beautiful and permanent one. Conventional treatment was introduced, and law and order reigned. Then it was that the Renaissance developed into that refined style, known as the Cinque Cento, or that which was in vogue in the 16th century.

The Cinque Cento is really the goal of the Renaissance. Its most refined development. Here the laws of conventionality, balance and harmony were recognized, and the mind, through the eyes, was satisfied. Natural forms were not used, but the type of that form treated in a conventional way. Unfortunately this high standard was, however, soon lowered by a neglect of those fundamental principles, upon which all art must be built if it hopes to be permanent.

The Louis Quatoize was a style in vogue during the reign of that monarch and depended for its effect entirely upon light and shade. It had, therefore, to be constructed in relief with stucco. The scrolls, shields, medallions and floral decorations were all built out in strong relief. Gold was used profusely to help accent the lights and give sparkle to an already fantastic treatment. While this style had much to recommend it, in spite of its vices, it soon deteriorated into the well known but debased Rococo, where every law of order was ignored and artistic impulse ran riot.

Now then, what do we learn from studying this evolution of decoration. We see that one style grew out of another, that it was modified more or less as it grew, and that it improved or deteriorated. We find that the Egyptian, Greek and Cinque Cento have about them a simplicity and permanent quality that stamp them with a superiority over the others. We also recognize that the Roman and Romanesque are inferior to the Greek from which they were evolved. That the early Renaissance was inferior to the later or Cinque Cento period, and we ask ourselves, why these differences?

The reason is that the authors of the three styles mentioned, appreciated the fact that decoration is at its best when it recognizes rythm, that there must be a poetry and music to it. Indeed decoration is to art what poetry is to literature. The Romans borrowed of the Greeks, but how? They simply copied motives without endeavoring to find out what laws controlled their construction.

The designers of to-day make the same mistake. They appropriate the ornament that pleases them from this style, or that, and even mix them in a most absurd way.

(To be continued.)

From Chemnitz.

HOSIERY — COLORS — PRICES — SUPPLY — GLOVES — FANCIES IN DEMAND.

In every color and in every combination of color, one finds fancies in demand. Firms on your side, disappointed with their work while here, others who never send agents here but buy over there, are keeping the cable working day and night hoping to do now what they should have done six, surely three or four, months ago, to get fancies. With a very limited capacity, only 400,000 dozens, with the whole world howling for fancies, with Continental buyers offering advanced prices, with a desire to do justice by old buyers, men who for 15, 20 or 25 years have been the mainstay of the Chemnitz hosiery trade, with awful uncertainties hanging over the United States trade, you can imagine much better than any one can describe, the emotions and moods of merchants and manufacturers who want to give hosiery to all men and women on earth.

Anything in colors! Of course the call, in fact the cry, is for plaids. Roman rings and stripes, in eastern colors, go, but by no means so well as the colors of Clans Cameron, McDonald, McDougall, Campbell and Argyle. "I don't give a continental what they are if they are plaided," is heard everywhere. Anything striped or squared. Buyers are as terribly disappointed as are the manufacturers. It is exasper-

ating to both. The one is willing to pay prices that will leave large margins of profits, but must get guarantees for goods. The other is only too anxious and willing to give the goods, but cannot give the guarantee. The rush has come on the manufacturers unawares. No one was prepared. Think of men with machines idle (staple machines) forced to turn off orders for thousands because they can neither build nor buy. Talk about apples of Hesperides, golden sunsets, Italian skies and Australian birds, Tantalus reaching out for drink and food he was never to taste, and you get a good, though a mild, picture of what this market offers.

Blacks, ox bloods and tans take up ten, perhaps fifteen per cent. of the orders. I hear that Rembrandts and Richelieus are running well. They are the nicest of the blacks. They are wide ribbed goods. Whence the names I know not. Prices, due to advance in fancies, have gone up several points.

Fashion's votaries are her devoted slaves. No fetich-fearing or worshiping African ever bowed lower to his idol than do fashion's followers at her gilded shrine. All efforts made by New York and other merchants to stay the avalanche that took everything from blacks and ox bloods to fancies, failed. No rainbow chaser, or boy after a swift winged bee or butterfly, had harder work than do these same merchants or their agents to get into the line that has to file like ticket takers on turn, to the supply tables.

Higher prices prevail. No one who knows how low they had fallen will fail to feel pleasure at the advances. Even staples, sinking lower and lower, looked up at last, feeling the influence resulting from the great demand for fancies. Prices rose 15 to 20 per cent. Even then they are nowhere near what will put wages on a par with ours. Low priced goods don't go for a cent.

Orders are being taken on a hope, not a belief, that they can be filled. Of course, if orders can wait till fancies run out, they can be filled; but buyers who want goods for early delivery, may delude themselves into a belief that they will get them but, well, a good guess is, that they won't. "Stock" lots and "job" lots are not to be had. Buying must be against orders. From behind man's memory no one ever saw anything so exasperating. Like a summer cloud it is to pass away. What will follow? "Had any word of warning been spoken we might have been better prepared." Who has ever heeded words of warning? Since Israel's earliest hours prophets are not without honor save in their own country. Few are ever able to foretell fashion's freaks. The lips of Egypt's sphinx were never less liable to reveal secrets than the wonderful woman that has tumbled down Minerva, Diana and a dozen other godesses.

Orders are being booked by wire, telegraph, cable and telephone. That it pays to put in an appearance, once a year, at least, this season has demonstrated. Only the men here have any good guarantees as to the getting of goods.

In textile gloves all that is to be said can be collected into a stick full of nonpareil type. Better grades are being bought; but only very, very slowly. The Continent is calling for imitation—Astrachans with leather palms, the so called Krimmers. They are going well, and in elegant colors and excellent workmanship.

When blacks began to go, 10 years since, manufacturers broke up all their wooden, fancy frames to make room for new iron ones. Now these manufacturers are in the mud. One of those old woolen fancy frames would be worth to-day—10 weeks ago—its weight in gold. C. J. BROWN.

[*Reported exclusively for the Textile World.*]

Comparative Life of Cotton Machinery and Valuations.

Paper presented by Edward W. Thomas, agent of the Tremont & Suffolk Mills, Lowell, Mass., at the October meeting of the New England Cotton Manufacturers' Association.

(Continued from December.)

In fully considering the life of machinery, much depends, as has already been mentioned, upon localisms and the general make-up of various elements, including proper management.

It is not an uncommon sight in some manufacturing centres, especially those incorporated years ago, to find cards, speeders and looms running that were built from thirty to forty years ago, still doing fair work, but at an expense of production and labor cost. But, there certainly is a time, and a proper one, that comes in the life of all the machinery in our mills, that to run beyond, is like sliding down hill. A mill built fifteen years ago ought to be in good condition to-day, but it cannot compete with the modern mill of to-day in cost of production, and this latter is the whole basis of comparison. The cost of comparison is strictly the only criterion upon which the value of any mill plant can be determined.

Our manufacturing friends abroad have given the subject a more thorough study than we have. Keen competition encountered there renders it necessary for the manufacturer to have the very best tool with which to produce his goods for the market. When the time arrives that any manufacturer abroad finds his competitor can undersell him, he instinctively knows that there is some good reason for it, and it matters not to him how recently his mill was furnished with new machinery, if his competitors have better, he must necessarily lead them by substituting new machinery for old. He does not hesitate; it is life or death with him. He does not consider, as many of us are apt to, that a card ought to run a certain number of years, a mule so many, and a loom so many.

Trespassing upon your patience for a few moments, allow me to give you the text of a letter recently received from one of the largest manufacturers in England: "In reply to your favor of the 14th inst., it is rather difficult to give replies to your queries, as the method pursued in this country varies very much with varying circumstances. Machinery well constructed and well finished, if properly attended to, would work for thirty years, but it is generally found that the improvements which are constantly taking place, make it advisable to renew machines (especially mules) when they have worked twenty years, or, in some cases, less. The best managed and most successful concerns keep their machinery in the best possible state of repair, and other practice would be most unwise and result in ultimate loss. Card clothing should be renewed every six or seven years, and the following repairs made when necessary, which will depend upon the attention given to the machinery: Front lines of bottom rollers renewed or repaired, and roller stands rebushed; mule spindles stretched, refooted, and warves all skimmed down to one uniform size; mule roller beams and carriages squared up and pin-rollers balanced; frames in card room re-spindled, flyers balanced, collars and foot-steps renewed or rebushed. Some concerns make a practice of carrying out a portion of these repairs regularly every quarter, the cost being taken as ordinary expenses. When a large amount is spent on repairs at one time, the cost is carried to a suspense account, which is wiped off at a certain rate per quarter. Sometimes the cost of these repairs is added to fixed stock account, or deducted from the amount allowed for depreciation, but this is not considered a sound policy."

It is indeed a difficult matter to establish a rule applicable, even to a few cases, for determining the life of machinery. Its life must be of that duration, that it keeps ahead or abreast of competition. As has been stated before, localisms, character of the production of the mill, and many other characteristics must be considered. I believe that the time has come, or is fast approaching, when we will give far more attention to the condition of our machinery in our mills than ever before. No more striking illustration of the life of machinery can be made than in the press rooms of the great city daily papers. They barely get a press started before there is a new one in the market, outstriping the former, and in order to keep "in the swim," they throw out the recently purchased one and put in the new. We have had a salutary lesson in this, in the spindle line. It is but a few years back that the introduction of the Sawyer

spindle created an experience of general surprise. Hardly had it been introduced generally, before it was supplanted, in a measure, by the Rabbeth type of spindle, and the extent to which the latter is used is well known, and its merits and saving to the manufacturer have been very ably and fully illustrated by General W. F. Draper, in his address at the Chicago exhibition. Keen appreciation of, and a prompt introduction of improved devices and systems, have come to be an important element to the manufacturer who intends reaching success in dividend paying, and this is becoming more of an important feature than has ever been recognized. The subject under consideration is an important one.

Mention has been made of the depreciation of machinery, due to improvements, as an important element in the life of machinery, and trespassing upon your patience for a few moments, on the subject of mill valuation, this subject being closely allied, in a measure, with the title of this paper. The Northern manufacturer, particularly if located in a city, has many disadvantages in the way of local valuation for taxable purposes. In many instances the mills ante-date the incorporation of the city, and have practically given birth and life to the locality, and are the bone and sinew of its prosperity. These facts do not seem to be fully recognized or appreciated by the local assessor, and, in consequence, in many cases the manufacturing plant has to bear a larger burden of taxation than it ought. The following table will show the spindles, taxes, etc., of several large cities noted for their cotton manufacturing industries:

For the year 1897, the cotton mills in one of the large cities in the foregoing table are valued as follows:

City.	Spindles.	Capital.	Taxes.	Per cent of taxes of city paid by mills.	Tax per spindle.
Lewiston.....	267,444	$ 4,700,000	$ 89,341.00	30.97	33 40 cents
Manchester.....	575,000	7,600,000	176,741.85	33.	30.7
Lowell.....	840,000	10,150,000	204,346 00	16.	24.3
New Bedford.....	1,272,716	11,850,000	245,459.97	26.	19.3
Fall River.....	2,798,050	23,073,000	566,625.00	46.20	10.25

Plant.	Valuation of Machinery per spindle	Valuation of Mill Buildings per spindle.	Spindles. Approximate Number.
A.	4.32	1.73	48,000
B.	4.83	2.73	154,000
C.	5.82	4 85	110,000
D.	5.42	5.14	70,000
E.	5.76	2.21	120,000
F.	5 51	5 06	169,000
G.	5.59	3.31	182,000

There does not seem to be any general system in use by local assessors, whereby their valuations are made, and the excessive valuations placed upon mill properties in the New England States generally is a great burden. For many years, the valuation of machinery in each of the large mills in Lowell was on a basis of $7 per spindle, irrespective of whether the mill was coarse or fine, whether it had any auxiliary machinery or not, in the way of finishing, bleaching or printing. Several cases were carried into court, appealing from such valuations, and notable reductions were made in many instances by parties hearing the same. I only speak of the above to show the fact that the subject of depreciation and present value of mill plants is very lightly understood, and ought to receive more careful consideration, in order to assist and foster an industry that in our New England States needs all the assistance that can be given it.

The valuations put upon mill property of equal productive capacities, manufacturing the same class of goods, located at different centres, are quite varied. In some instances, the

taxes have been exempted for a term of years, in case of building new mill properties. For taxable purposes, no specified valuation should ever be placed on the individual machine of the mill plant, for it is simply part and parcel of a unit for productive purposes, and said unit should be considered as a whole. It matters not as to what the machine originally cost, but it does matter considerably whether the whole plant, with its buildings, power, tenement property, proximity to accessible freight facilities, nearness to labor market, is a good, bad or indifferent tool with which to manufacture with economy. Local taxable valuations too often are based on the amount of brick and stone in buildings, and the amount of machinery, and other tangible property. Its valuation as taxable property should be based on its market value, productive capacity, dividends earned, and not on cost or what it may have done five years before. In some localities mill plants are actually assessed for more than they could be built complete for at time of valuation. This has been proven times without number.

The question of local taxation has been brought to the attention of the courts in Lowell, Lawrence and Fall River, within the past few years, and much benefit has been derived to the manufacturer from the decisions as given by the court. In every instance that I am acquainted with, that has been tried before a county commission, or a justice of the Superior Court, notable abatements have been granted the petitioners. In Massachusetts, the State tax commissioner has practically rules laid down for his guidance in levying the State tax, and the most important is that based on selling price of the stock, as on May 1st of each year, taking the number of shares of the capital stock and multiplying by the market value as of the above date. From this amount is deducted the surplus of the company, if any, and the balance is said to be the value of the taxable property in the city or town in which the mill is located. What better way of valuing mill property is there than this? It certainly is worth no more than the community are willing to give for it in the open market. But the tax commissioner frequently finds that his valuation is exceeded by the local valuations of the assessors.

Taking another condition of valuation of a mill plant: that of value to the owner, in the machinery line. It is very evident that as long as any machine in a mill is productive as such, even if thirty or forty years in use, it has a value more than its worth as "junk," but that value must necessarily be low, on account of its form, amount of production, and the other various limitations connected therewith.

In valuing a mill plant, not only does depreciation due to improvements in machinery come under consideration, but the depreciation due to the improvements made in our power plants and buildings. Our old power plants, whether steam or water, are not to be compared with the present economic forms. The substitution of compound and triple expansion engines for the plain condensing engine; the horizontal turbine, requiring practically no wheel pit, as for the old style upright wheel; the substitution of iron or steel tubing laid in the ground for conducting water to the wheels from upper level canal, or river, and tubes to conduct the waste water away, in place of the former system of expensive feeders, forebays and raceways; the improved method of driving from engines and wheels into mills; from using four pounds of coal per h. p. per hour down to about 1½ pounds per hour in steam plants; efficiency of turbines increased from 75 per cent. up to 85 per cent. All these modern ideas are found in mills as built to-day, and against which we must compete.

Great stress has been made for years that a mill located adjacent to water power greatly enhanced its value. This impression is gradually vanishing like a mist. While it may have been true up to a few years ago, it has lost its value as a chief fact or in locating a mill plant. By the improvements made in electric transmission, mills may be built almost anywhere regardless of the water

power site, if such locations are more favorable from the prominence of other factors.

We are far behind our English friends in the matter of running machinery. The sinking fund, carried on by them, enables them at the proper time to remove their old machinery and replace with new, and the custom has this advantage, that it certainly keeps the excellence of their machinery at the highest point at all times, reducing their repair account and obtaining at all times the full benefit of all the improvements that are continually being placed in the market. And on this point, and at this time, it might be well to compare the costs of mills both here and in England.

From figures obtained from the best authentic sources both here and abroad, taking as a basis a mill plant of 1,000 looms, on sheetings, and the cost in this country for plant complete, except land, is about $15 per spindle, while the entire cost of mill on the other side would not be over $6.50 per spindle. The spinning mill to-day can be built and equipped in England for from $5 to $5.50 per spindle. This certainly gives the English spinner a great advantage, in so far as capital is concerned. The English manufacturer also has other advantages over the American in many ways, as less wages and a more direct method of buying of the stock for, and selling the production of, the mills. Rent of new sheds for weaving in England, all complete, filled with weaving machinery ready to run, is about $10 per loom per year. Tenant pays taxes, furnishes coal and does all repairs.

I give below information given by a gentleman prominently connected with a large number of the great cotton establishments in England. He says: "Depreciation in general is 2½ per cent. on buildings, 5 per cent., as a rule, on machinery, although some concerns use 7½ per cent., and 7½ per cent. on boilers and steam plants. The depreciation each year is on the reduced value, brought forward each year. Income tax assessors allow 2½ per cent. on buildings, 7½ per cent. on machinery, other than the steam plant, 5 per cent. on steam plant, gearing, shafting, gas and water piping. Depreciation usually starts after six months running. Interest is not considered in depreciation accounts; i. e., the money set aside for depreciation can be used without considering interest."

The following table, based on these figures, may prove to be of interest as showing the values after some years of service of machinery, the figures representing the percentage either on original or reduced valuation:—

Column No. 1, representing the end of each year's use.

Column No. 2, is based upon a depreciation of 2½ per cent. annually on the reduced valuation of each year.

Column 3, is based upon the same per cent. annual depreciation but upon original cost.

Column 4, 5 per cent. annually on reduced valuation each year.

Column 5, 5 per cent. annually on original cost.

Column 6, 7½ per cent. annually on reduced valuation each year.

Column 7, 7½ per cent. annually on original cost.

TABLE NO. 1.

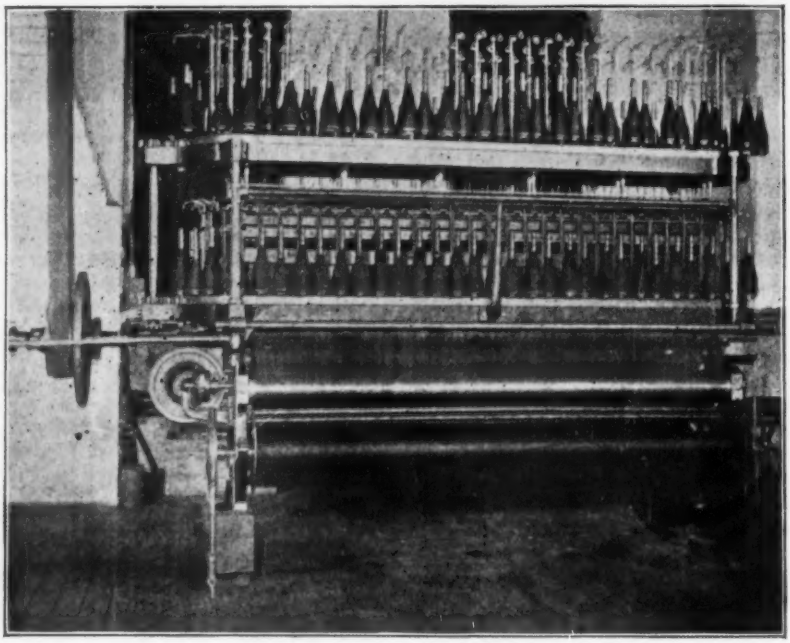
No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
1	97.50	97.50	95.	95.	92.50	92.50
2	95.06	95.	90.25	90.	85.56	85.
3	92.68	92.50	85.74	85.	79.14	77.50
4	90.36	90.	81.45	80.	73.20	70.
5	88.10	87.50	77.38	75.	67.71	62.50
6	85.89	85.	73.51	70.	62.61	55.
7	83.75	82.50	69.83	65.	57.93	47.50
8	81.65	80.	66.34	60.	53.58	40.
9	79.61	77.50	64.03	55.	49.56	32.50
10	77.62	75.	60.83	50.	43.84	25.
11	75.68	72.50	57.79	45.	40.33	17.50
12	72.79	70.	54.90	40.	37.30	10.
13	71.94	67.50	52.15	35.	34.50	2.50
14	70.14	65.	49.54	30.	31.91	
15	68.39	62.50	47.06	25.	29.51	
16	66.68	60.	44.71	20.	27.30	
17	65.01	57.50	42.47	15.	25.25	
18	63.38	55.	40.34	10.	23.36	
19	61.89	52.50	38.32	5.	21.61	
20	60.34	50.	36.40		19.99	
21	58.73	47.50	34.58		18.50	
22	57.26	45.	32.85		17.11	
23	55.83	42.50	31.21		15.83	
24	54.43	40.	29.65		14.64	
25	53.07	37.50	28.16		13.54	

(To be continued.)

—The cotton-spinning industry in Japan has made further progress this year. According to a native paper, there are now altogether 56 mills in Japan, with an aggregate number of 760,000 spindles.

The Millar Loom.

Some allusion has been made in our foreign exchanges to a new loom patented in Great Britain, France, Belgium and this country, capable of making a new style of fabric, one possessing the qualities of both a knitted and woven structure, which, according to the testimony of experts, has not been accomplished before. We have had some inquiries about this loom, and have answered one of them in our department devoted to questions and answers. Considering the interest that is taken in this invention, we have been to some trouble in obtaining information and an illustration of the machine, from parties most concerned in it, in England. The foreign patents belong to what is known as the Millar Loom Company, which it is intended to float with a share capital of $1,750,000. We may state that the company does not possess the American patents, which are still in the hands of the inventors, one of whom is Levi E. Salisbury, 160 Smith St., Providence, R. I. At the present time, Mr. Salisbury is in Nottingham, where the loom is being built by George Blackburn & Sons.

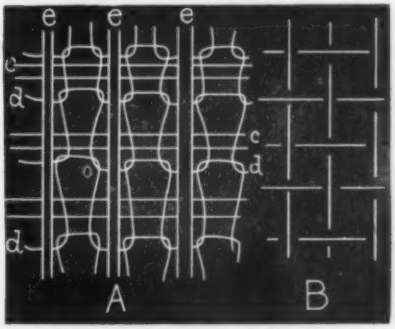


THE MILLAR LOOM.

The ordinary weave on the old loom is an interlacing of yarn (Fig. B), but in the Millar loom the weft is laid on the face of the warp (Fig. A, which we give just as we received it), and each crossing is secured by a third, or tying-in, thread,—a knitting stitch, in fact, the yarn for which is carried on the bobbins shown on the top of the machine, whilst the straight weft is carried on the lower row of bobbins, and the warp is beamed in the ordinary way, as shown. The illustration of the machine does not show the warps on, for convenience sake. A piece of cloth is woven on each side of the loom at the same time. The pattern loom makes cloth 75 inches wide on each side.

Briefly stated, it is claimed that the Millar loom equals six ordinary looms, and that one man or woman can run nine of them. The power required is stated to be 1-4 h. p. per loom, when

driven at full speed. The space occupied by the loom is a little less than that occupied by the ordinary loom. One of the advantages claimed for the loom is that it can weave much tenderer yarn than the ordinary loom.



This is due to the almost entire absence of tension on the yarn. Of course, this means that yarns made from cheap material can be used to advantage.

The London Wool Exchange.

H. HARTLEY.

Concluded from December.

The selling brokers may be said to form a kind of close corporation. Only eleven firms are engaged in conducting the auctions, and together they form the Wool Brokers' Association, of which W. H. Willans is president, and E. C. Buxton is honorable secretary. Mr. Willans who is one of the most active spirits in the London Chamber of Commerce, is the head of the well known firm of Willans & Overbury, while Mr. Buxton is a partner in the firm of Buxton, Ronald & Co. Messrs. Jacomb, Son & Co. are said to be the largest sellers of Australian wool. Other names prominent on the Wool Exchange are Helmuth-Schwartze & Co. and Charles Balme & Co. All these firms issue periodical circulars and catalogues relating to the sales, almost each lot having its particular descriptive mark, such as "Trawalla," "WWW," etc. These names and marks enable buyers to identify the exporters of the wool and assist them to estimate its value as they look through the bales at the warehouses. In the case of bales bearing well-known marks, the buyer can rely upon the wool being of the same quality throughout.

The wool has to be taken away from the warehouses within fourteen days of the sale, whilst, on the other hand, the purchaser can demand delivery of the goods within seven days. According to another rule of the Exchange, payment has to be made in full before the wool can be removed from the warehouses.

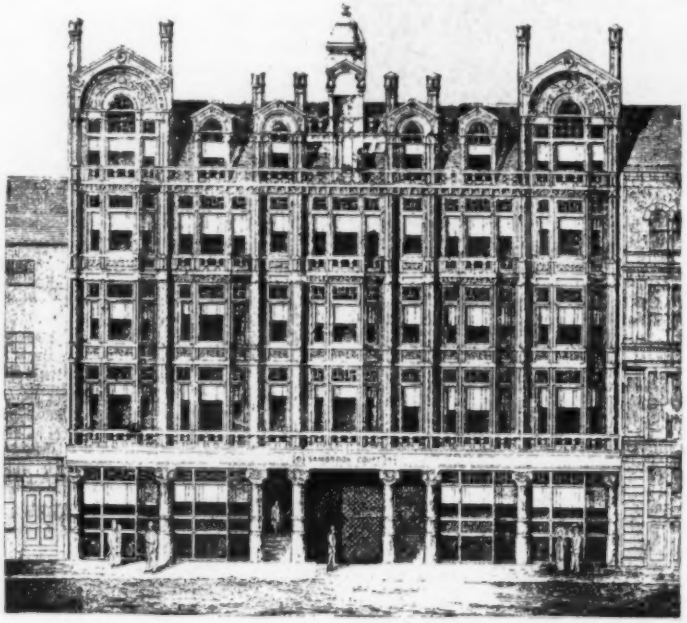
It will be readily supposed from what I said, that the task of buying and selling wool is not altogether an easy one; in fact those who have to bid at the sales must find it the hardest work they have to do. The Wool Exchange and its environments, however, lighten the fatigue as much as possible. Thanks to the electric light and a splendid system of ventilation, the atmosphere of the Exchange, even when it is most crowded, is kept pure and comparatively cool. Then in the intervals of buying, visitors to the Exchange can find in the building itself all the refreshment and recreation they can possibly desire—Turkish baths, smoking-rooms and what is called the "Kaira Library," at which the purchaser of a cup of coffee or tea can read the magazines or a book selcted from a catalogue of many hundreds of the most popular works of fiction. This large, comfortable lounge has but one shortcoming in the eyes of the wool-buyers, and that is an index to the progress of the sale upstairs. I believe that some scheme is now under consideration, however, by means of which the number of each lot, as sold, will be announced. If it is successfully adopted, the wool-buyer will then be able to enjoy in peace his book and his cigar till the approach of the number for which he wishes to bid.

Besides the Wool Brokers' Association as lessors of the Exchange, the company has about a hundred tenants, most of whom are more or less connected with the wool trade. In this number are included the principle railway companies and carrying agencies, which, through the stress of their competition for freights of wool, have found it desirable to have offices on the spot. On sale days their represen-

tatives are busy in negotiation with large buyers, and in the endeavor to secure freight they are constantly in communication, by means of the telegraph and telephone, with their chiefs. Mounted messengers are also employed when full instructions have to be sent regarding the carriage of extensive purchases of wool and the rates at which it can be undertaken.

I have spoken of the great development of the wool trade of the colonies with England. That development still continues. In 1894, wool to the value of £24,748,000 was imported from Australia and the Cape; ten years before, the value of the imports was only about £20,000,000. Nor is this all. In the same period, the value of the bale had fallen from £16 to £11.10s, so that, whereas in 1884, there arrived 1,303,000 bales, in 1894, the number of bales, each weighing about 330 lbs., totalled 2,152,000. These figures loom up very large, even if we only look back about thirty years, for in 1863, the value of the imports was not much in excess of £7,500,000, although the bale was on the average, then, worth £22.15 s. It may be of interest to add that of the 1894 consignments only aout one twelfth came from the Cape. Since 1860, the importations from Australia have increased ten-fold, whilst those from the Cape have barely increased four-fold.

A few years since, the future of the Wool Exchange was threatened by several large manufacturers, in Bradford and Huddersfield, buying wool direct from the colonies. In the first year of this experiment luck favored them, and it resulted in considerable saving. But the next year, when others followed suit, the second experiment was much more disastrous than the first had been successful. Before the wool purchased in Melbourne and Sydney reached England there was a great fall in prices, and in consequence one merchant confessed to a loss of £70,000, whilst a spinning firm were losers to the extent of £50,000. This was in 1890, and the dangerous proceeding has not been repeated. The purchase of wool in advance of a two month's voyage is evidently far too speculative for well-constituted business minds, and there is, therefore, every prospect of the



EXTERIOR OF WOOL EXCHANGE BUILDING.

Wool Exchange continuing to grow and prosper with the growth and prosperity of the trade of which it is the chosen centre.

Progress in Cotton Manufacturing in Russia.

Read before the New England Cotton Manufacturers' Association, at Philadelphia, by Vladimir P. Polevoy.

(Continued from November.)

In almost all our mills there is a tendency to introduce machines which would reduce the number of workmen and make the work of an individual workman easier. The picker and mixing rooms are furnished with the latest automatic feeders, sorting grates, pneumatic cotton elevators and the exhaust openers, which, besides the improvement in the hygienic conditions of the workmen, through the removal of the dust, lessen the work. The revolving flat cards of English make are introduced more and more, and the railway heads are consequently dispensed with. The combing machines are also widely introduced in our mills. The metallic drawing rolls found their application in Russian mills, and quite a number of them have been imported from America. As regards the ring spinning frames, up to a very recent time such frames have been used only for warp yarns, but lately ring frames are speedily replacing the mules in spinning filling yarn. This system of spinning evidently found favor in the eyes of Russian manufacturers, and now we see some mills equipped exclusively by ring frames for the final spinning of both warp and filling yarns. In the weaving business the wide application of Jacquards and dobbies is noticeable, and it is a question of but a short time when the celebrated Northrop loom will find its way to the Russian cotton mills.

The application of accident-preventing devices to different spinning and weaving machines, is an accomplished fact in almost all the mills in Russia, and absence of such devices appears now as an anachronism. As regards the efforts of the mill owners in the direction of improvement of life conditions and sanitary surroundings of their workmen, it must be said that these efforts were not limited to the improvement of the interior of the mills, but were extended to the living quarters of the work people in the way of constructing model houses in accordance with the latest hygienic principles as regards the size, light, ventilation and other conveniences for the families of the workmen.

It will not be out of place to say a few words regarding the relation between the employer and the workmen in Russian mills. Here in America the help is hired by week, day or piece work. At the end of the week the operative draws his wages, and if the work is slack he may be laid off for an indefinite period; and the operative in his turn may give notice to the employer regarding his intention to leave and find employment elsewhere. Here, the liability of the employer is limited to the wages paid to the workman. The employer has nothing to do with the outside life of his workmen, where he lives, how he lives, whether he has a church to go to or a hospital to be treated in when needed. Each workman has his own doctor and pays for the professional serivces of the same out of his own pocket. An entirely different state of things is found in Russia. It is true that the wages of a Russian workman are twice or three times lower than the wages of an American workman, and twice as low as that of an English workman, but in Russia the employer is compelled to hire his help only twice a year, and not by day or week, but for a period of six months. This usually takes place after the Easter holidays and in the fall. At that time he is also free to discharge his help if he so desires. Outside of his pay (which is calculated per day, and in some cases per month, and sometimes, in rare cases, though, by piece work) the workman is provided, free of charge, with lodging (for families separate rooms are given, or if no quarters are provided by the employer, rent money is allowed in lieu of rooms), fuel, water and light. When a workman is sick he is treated at the mill's hospital free of charge, medical

help being afforded gratis also to the families of work people. Care is taken of the children whose fathers and mothers are at work in the mill, for which purposes there are established free children refuges, and for infants, cradle rooms. Each mill has a school for the children, all the expenses of which are borne by the mill owners. Nay, the mill owner is expected to provide for the spiritual needs of his workmen, so that mills have to keep a church or two, or even three, as is the case with the Great Jaroslavskaia Manufactura.

I must mention the fact that the mill owners have elicited a highly laudable spirit in meeting the demands of the government by doing even more for the bettering of conditions of their workmen than was required of them. They build hospitals, schools, almshouses for the benefit of their workmen, and some of them, like the owners of Jaroslavskaia Manufactura, illustrated in November issue, Messrs. Karsinkines, went so far as to build a theatre for the enjoyment of their work people; and all this is done at the expense of the owners and entirely free to the workmen.

Notwithstanding the willingness of the mill owners to further the interests of their workmen, they are often handicapped by the burdensome requirements of the government, like, for instance, keeping a police force in the mill, which the Russian passport system makes imperative. Outside of this, the annoyance caused by the factory inspectors cannot be paralleled to anything of this kind in Europe and America. Owing to the liberal ideas which prevail in Russia since the latter part of Alexander III.'s reign, the places like those of factory inspectors are filled by men with pronounced liberal ideas. And in Russia, owing to peculiar Russian conditions, men with such ideas regard the employers, if not as sworn enemies of the employed, yet as creatures fully devoid of any sympathy with the working classes, and therefore on every occasion rule everything in favor of the employee against the employer, so that a factory inspector in Russia, with a few exceptions, is regarded as a kind of nuisance.

It is highly creditable to the Russian government to take the part of the workman, but this is sometimes done to the detriment of the mill owners and stands in the way of introducing labor-saving machinery in the mills. Take, for instance, the Northrop loom. At the present time in our mills, one weaver tends to only two looms. If you were to make one man look after four looms, which he could do with considerable less trouble and with profit to himself, he would turn around and demand double pay, and the government would back him up. If he were to look after eight looms, he would be sure to demand four times his pay, and so on.

The introduction of labor-saving devices in Russia was marked by terrible riots and bloodshed and destruction of property unrivalled in any other country. This alone makes the government to stand constantly on the watch between the employers and the employees. When the power looms were introduced in the mill of Scheibler, in Lodz, Russian Poland, the workmen, feeling that this meant the loss of work for one-half of their number, destroyed the mill, not leaving one stone upon another. This is what makes the Russian mill owners shy of the immediate introduction of the Northrop loom, which has been tested in Russia and found to work satisfactorily. To this is coupled another circumstance which makes the Russian manufacturers not over zealous in the introduction of new inventions, viz., that at the present time, even with old looms and machines, they get 20, 30, 50, and in some instances, as high as 80 per cent. on the capital invested in the mills. The extremely high tariff on yarns and cotton goods makes it possible to get as high as 80 per cent. on capital invested, and have the sales of manufactured yarns and cloths to be made for one, two or even three years ahead. I read in Russian papers that at Nijni Novgorod Fair, yarns and calicoes have been sold up to May, 1899.

(To be continued.)

Southern Factory Help.

We show on this page a group of Southern factory help, which we think will be particularly interesting at this time when there is so much discussion concerning the labor competition between Northern and Southern cotton mills. Those who have visited Southern factories and observed the help therein, have been impressed with their good appearance and intelligence. The work people are from the yeomanry of the South, and each mill draws very largely from its immediate neighborhood for its employees. There is very little foreign population in these mills, or in the rural districts of the South. The natural capacity of the Southern operatives is fully on a par with that of those in Northern mills.

FACTORY EMPLOYEES, STATESVILLE, COTTON MILLS, STATESVILLE, N. C.

This illustration was used in a recent lecture on cotton cultivation, by C. P. Brooks, director of the Lowell Textile School.

—There are certain staples even in so-called fancy goods and in almost all cases, the organization which largely fixes the price, limits the amount of "pattern" or design which can be put upon that fabric, and after a cloth is woven it must have a place in the trade, else it is not wanted.

Mercerized Cotton.

It has been found that cotton when mercerized in a strongly stretched condition, and washed while still stretched, takes a silken gloss and acquires a greater strength. After the cotton yarn or cloth is subjected in a highly stretched condition to the action of lyes, the purpose being effected when the material takes a parchment-like appearance, it is washed while still stretched, "until the internal stresses existing in the fibre have ceased." On removal from the stretching apparatus it may then be dyed or otherwise treated without fear of shrinking. Instead of using a special stretching device, the fibre may be subjected to the action of strong alkaline lye or acid while wound on cops, reels, bobbins, etc., in which state the thread is in tension. It is advisable to use apparatus specially suited for the treatment of cops, etc., in this case, for obvious reasons. If the loose or stretched fibre be stretched during the mercerizing process beyond its origi-

nal dimensions it can be washed without being in tension. This modification is specially suitable for very loosely twisted materials, which after the action of the mercerizing liquid and after the removal of the excess liquid are stretched beyond their dimensions when in the raw state, and can then be washed without tension.

Superiority of Diffused Light.

The superiority of diffused light over that which is direct is now generally insisted upon by scientific experts, the fact being urged that, while the latter wearies the eyes and predisposes to short-sightedness, the former is, like sunlight, soft and soothing. The principle involved in lighting a room by this method is certainly sufficiently simple and practicable for its general adoption, consisting, that is, in having reflected upon the ceilings and walls the required luminous rays, which thus fall softly on the desk or work table. All that is necessary to secure this result is to place a reflector not above the source of light, but below it, by which arrangement all the rays are reflected towards the ceiling. In some of the public assembly places and institutions of France, unique methods are resorted to in carrying out this plan—as at the school of St. Cyr, where a conical reflector, painted entirely white, is placed under the arc lights—while at the lyceum in Aix, a parabolic reflector is used, which is bronzed on the lower and silvered on the upper part; a great light is thus obtained far more than if direct.

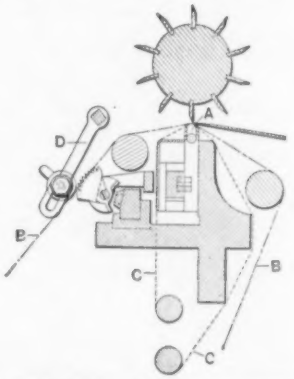
Rubber Rest for Shearing Machines.

The idea of an elastic or yielding rest for a cloth shearing machine is an old one. There are American, English and French patents embodying this idea, that were granted as far back as 1815. The object sought, as set forth in these old patents, was to get a rest with an edge of a yielding nature, so that knots or bunches on the back of the goods would sink into its soft bed and not lift the cloth into the blades and cause shear marks.

Various substances were tried, but with little success until rubber was introduced and even then, as the manufacture of rubber was yet in its infancy, a perfectly elastic rest was not attained.

With the recent advances in rubber manufacture, the making of a rubber tube of almost uniform diameter and texture is possible. Such tubes are now used as the elastic edge to hold the cloth to be sheared up to the cutting edge of a cloth shearing machine, and they are found to be perfectly satisfactory.

If the supporting groove in which the tube is held is jointed at both ends and furnished with list saving mechanism like that of a Parks & Woolson shear, then the tube will support the cloth up to any desired distance from the edge of the cloth as it may be adjusted. The selvedge is therefore automatically saved from cutting exactly as in the steel list saving rest of a Parks & Woolson shear and thick, cockly or loose listing is perfectly preserved.



A—Rubber Roll. B—Cloth. C—Apron. D—Feeler Catch Roll.

The outline cut herewith, shows the latest form of list saving rubber rest built by the Parks and Woolson Machine Company, of Springfield, Vermont. This is the result of much experiment and study and they have these rests in practical use in many prominent mills.

In this rest the tube is simply cemented to its seat, like a bicycle tire, and after it has been straightened and adjusted it needs no further attention during the whole life of the tube.

Both double and single shears are built with this style rest when so ordered.

Old Parks & Woolson and other shears may also be equipped with an entirely new shear top with this rest at a cost much less than a new rubber rest shear.

Style Suggestions for Woolen Manufacturers.

The opening of heavy weight coatings has been delayed by the unseasonable weather, and will be late.

The wholesale maker has large stocks of coats, and until these are moved, he will not be ready to place orders for new goods. There was a large sale of stock kerseys during the early fall, and most of the large manufacturers have stocks of goods which will last for some time, and this, coupled with warm weather, will undoubtedly make the opening of heavy weight coatings very late.

There seems to be a growing desire to get away from kerseys, and the tendency is towards a radical change. What this will be it is extremely difficult to say, but the prevailing impression is that it will be the fancy back covert. It is not intended to convey the idea that kerseys will not have a large sale, for they will, and the colorings which will be in demand after the staples, are dark brown, dark olive, and green grounds with white mixes.

As a novelty, there will be a demand for fancy back kerseys. One maker last year had a line of these fabrics and did quite a business, but he seemed to be a little ahead of the trade, which will want them this season.

There is always a demand for very light tans and a maker who caters to this trade can obtain a high price for his fabrics, for this line is comparatively free from competition. The contention is made, and is well founded, that light shades cannot be made in conjunction with dark ones, on account of specks flying from the cards, and appearing as dark spots in the light kerseys; but this fact should not deter some enterprising manufacturer from making tans in a separate establishment. The demand is always greater than the supply.

Rough effects, except in the cheaper grades of chinchillas and friezes, are entirely out of it, the plain faced fabrics having superseded them. The cloth which demands the greatest share of attention to the kersey is the fancy back covert and whipcord. These should be made in tan and green olive face, combined with a white and tan plaid back, overplaiding with red, green, or yellow threads. While the fancy backs will be sold for overcoatings, there will also be a demand for these fabrics in plain back goods for suitings.

There is an increasing business in the shape of a fabric for traveling capes. These too, are fancy backs, and are usually a broad twill face, with a green and red, or red and blue plaid back, the more brilliant and striking the colors in the back, the readier sale they will find.

The coming season will witness the advent of many lines of worsteds which will be made part cotton. This will be done to have a fabric which will be cheaper than the all worsted cloths, which it is expected will open in the neighborhood of $2.25.

The effects in worsteds will be checks of all descriptions, and very few large plaids will obtain sale. The decided brown colorings will be dropped and the Scotch plaid effects will take their place. In cassimeres the same class of effects are wanted.

New York Dry Goods Notes.

James F. White & Co. have admitted Geo. M. Gray as partner.

Ballin & Taylor have succeeded G. & J. Ballin. Gustave and Percy Ballin and Chas E. Taylor are the partners.

C. A. Auffmordt & Co. get the Paisley account from the wreckage of W. G. Hitchcock & Co.

J. A. Dingwall, late assistant mana-

ger of Lord & Taylor's dress goods department, has been made manager.

R. H. Macy & Co. have enlarged their carpet department by moving it to their annex. Geo. C. English is to be in charge.

The Oregon City Mfg. Co. has secured C. A. Halse, Jr., late with the Rock Mfg. Co.

Hardt & Lindgens is now the headquarters of Martin Geiger's woolen accounts.

Abegg & Rusch have admitted Henry A. Rusch as a general partner.

J. W. Emerson, late of Ijams & Emerson has taken part on the management of A. D. Juillard & Co.'s woolen department.

The Cone Export & Commission Co. has taken new quarters at 89 Worth St.

J. W. Thorner has gone with A. D. Juilliard & Co. He was formerly with O. H. Hayes & Co.

Fred B. Harbottle has taken charge of Dudley, Battelle & Hurd's knit goods department.

F. W. Corse, of Hardt, Von Bernuth & Co.'s selling force, is about to go with Sullivan, Vail & Co.'s dress goods department in the Western district.

H. S. Phillips is to represent A. D. Juilliard & Co. soon in several large Southern cities.

Whitman & Phelps have moved to the Watson Bldg., corner Church & Franklin Sts.

Dry-goods imports show an increase of $557,000 during the month of November. Silks and cottons are responsible for the showing. With December to hear from, the year shows an increase of $15,300,000 shared by all divisions. Considering the rush of goods because of tariff enactment, the total is much below what might have been expected.

Jacob L. Phillips will sell the American Handkerchief Co., so lately incorporated.

Thos Cullen, owing to ill health, will retire from active participation in the firm of Converse, Stanton & Cullen.

Now that yarns are proportionately bringing much better prices than finished goods, some dress goods manufacturers have stopped their looms and are selling their yarns to knitters.

Edward M. Butler has signed as salesman with Joshua L. Bailey & Co. He was formerly with Smith, Hogg & Gardner.

Chas. Kahnan with C. A. Auffmordt & Co. and M. Geiger with Boessneck, Broesel & Co. are to do a woolen and worsted commission business.

J. S. Lowrey & Co. are to move to Worcester St., February 1, occupying numbers 115 to 121.

Gone to Europe: John Grundy, of Spielman & Co.; J. M. Tappan, of Dunham, Buckley & Co.; A. Salmon, of L. Spiegelberg & Co. and Salmon & Lumley; Chas. Muller, of Neuss, Hesslein & Co.; Thos. Smith, of Fred Vietor & Achelis; Ed Horrax; F. G. Hallett, of Hoeninghaus & Curtis; C. Loewel, of Boessneck, Broesel & Co.

Returned from Europe: Alfred Watkins, of the H. B. Claflin Co.; R. Lockhart and J. Z. Batten, of Sweetser, Pembrook & Co.; Ewald Fleitman, of Fleitman & Co.; C. Doehler, of J. & M. Lehman; F. Strubberg, of Passavant & Co.

J. H. Corry, late of Strawbridge & Clothier, Philadelphia, is to take charge of the linen, white goods and lace departments of R. H. Macy & Co.

Judge Hilton, according to his promise, is closing up the accounts of Hilton, Hughes & Co., paying his son's interest almost dollar for dollar.

Wool Market.

The principal feature about the wool market is its fineness, and the fact that the bulk of the wool is held in strong hands. There is no anticipation of any less price, for this staple, but, on the contrary, the prospects are favorable for some advance, mostly due to the shortage of this year's Australian slip. Our latest from Goldsborough, Mort & Co., Melbourne, show a belief in a short Australian clip, amounting to about 80,000,000 pounds, the greatest absolute shortage being in New South Wales, but the greatest percentage of loss being in South Australia. This shortage is due to the prevalence of drouth, the effects of which have been much more severe than were indi-

cated some months ago. Sound, well grown wool is extremely scarce, and although, perhaps, the general condition of wool is rather lighter than last year, and burr and seed less prevalent, the staple is materially reduced, both in length, strength and density. This condition of affairs had a strong effect upon prices at the last London sales. The wools of the New Australian clip amounting to about 86,000 bales, formed the chief feature of the sales. The impression that they produced was an unfavorable, though scarcely an unexpected, one. Some of the lots were in good order, and, taken as a whole, the quality of the clip thus represented was fine, and its condition rather less burry than usual, but in the majority of lots that were offered, the staple was deficient in length, very mushy and weak. A good many of the lots contained only inferior wool, and some of the good lots, even, had a proportion of hungry fleeces. This condition of the New Australian wool should be taken into consideration in comparing prices of the present with those of the last clip. Notwithstanding many of our mills are well supplied with wool, there is a disposition to make purchases at present prices, for evening up. A number of large mills have entered the market and bought heavily of Territory wools, making these rule active on a basis of 50 cents clean for the ordinary fine medium grade. Staple territory is scarce, and the price strong. Ohio and similar wools of an XX and above grade, command 30 to 32 cents per pound, in the grease, which would give the cost of the scoured pound at 65 cents, while Australian wool commands 67 to 70 cents, clean. The woolen mills are feeling encouraged, and at present writing are showing their samples of new heavy weights very sparingly. The mills are well supplied with orders to run them for some time to come.

Cotton Market.

There is very little to be said in regard to the tone of the market, since our last writing. Prices remain about the same, or 5 15-16 cents against 5 7-8 cents for middling uplands. Spinners evidently regard the price of cotton as low as it is likely to go, and this, in connection with the better selections that can be made at this time of the season, have induced them to buy comparatively heavy, considering the curtailment in production. Some of the leading mills in New England have been supplying themselves with cotton, and their store-houses are well filled, and temporary warehousing has to be sought elsewhere. The trade has now settled upon an estimated crop for 1897-98, of about 10,500,000 bales. With this crop on hand, there is but little prospect of the price advancing materially, but remaining about where it is at present, though the elements for an advance are stronger than those for a decline, due to the fact that the price is below the cost of production, which cannot exist indefinitely, though planters seem to be inclined, through the force of circumstances, in many instances, to plant a large area in cotton, with little consideration as to its future price. It is thought, however, that if the present range of prices prevails until planting time, a much less acreage will be devoted to cotton cultivation this year than was the case last year. It would be disastrous to the planting, if not to the manufacturing interests, if another crop followed the present one of the same size. Present indications are that more acreage will be devoted to wheat in the South, next year. This relative devotion of acreage to cotton and wheat is evidently agitating the minds of those in the cotton trade at Liverpool and Manchester, as noted in the query from Charles Stewart, that appears in our department devoted to questions and answers. The Egyptian crop is estimated at about 6,250,000 cantars.

—One can hardly expect to master all the different requirements of designing, as a thorough knowledge of the yarns which go to form the cloth, as well as an eye for color, and a clever pencil, with the draftsman's accuracy and the artist's skill, is required.

COTTON DEPARTMENT.

Mixing.

W. SCOTT TAGGART.

It would be something wonderfully strange if, when the question was asked, "Why have a mixing?" a dozen good solid reasons could not be rattled off with promptness and with a degree of certainty in their correctness that would put to the blush, the solution of a mathematical problem. A few years ago the mere suggestion of such a question would have been looked upon as an interference with a law of nature, and scant courtesy would have been meted out to anyone bold enough to ask the question direct. Indeed, now-a-days, one must be very careful in propounding the question and also be prepared for a good deal of abuse.

One cannot say with certainty that the question is ever really asked in a direct way, but of one thing there is no doubt whatever, namely, that the question whether asked or not, is frequently answered, probably unconsciously, in manner, and a practical manner too, that is quite opposed to the orthodox. The signs of the times are so suggestive in this direction that it may be profitable to spend a short time in examining the conditions surrounding a mixing, and try and arrive at some kind of conclusion that will assist us materially in answering the question, if we are ever confronted with it.

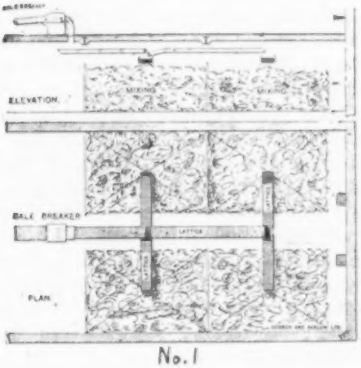
In the first place, a mixing is generally understood to mean a stack of cotton formed from a number of bales, the cotton of which has been to some extent loosened either by hand or machine. A judicious mixing of the cotton from the various bales in such a stack conveys the idea, that the characteristics of the fibres from the different bales are so equally blended as to produce the best possible average result, and in addition it is supposed that the loosened cotton forming the stack, permits the surrounding atmosphere to permeate and circulate through it, and so produce a tempering effect on the fibres after the severe pressure they have been subject to in the baling process.

We have already seen, in a previous article, that the best way to open the cotton from the bales is by machine, and also that the best results for mixing purposes would be obtained when the bales were mixed on the lattice of the bale breaker. Of course this last point is a question of convenience in many instances, but it can scarcely be doubted that a stack of mixing is blended much better if the cotton is partially mixed before it is spread on the stack, than if a layer of one bale is formed and then on the top of this a second layer, and so on in layers, each layer representing one or more bales of a special brand. By this "layer" method, especially in deep mixings, there is no guarantee that the cotton will be raked down from the top to the bottom of the stack and carried away to the hopper feeder or opener in this condition; if this were so, the method would merit confidence, but almost without exception the work is probably the most carelessly performed work in the mill, and it is no uncommon thing to see armfuls of cotton taken away from parts of the stack and sent to the opener, which cannot possibly have representative fibres from all the bales used.

On the other hand, when the bales are mixed at the bale breaker, the cotton arrives on the stack already partially mixed, and in the spreading over the area of the stack it is blended to such a degree that it might almost be considered ideal. A stack formed in this way does not suffer from carelessness, rather the contrary, and one can make laps from the top equal in blend to lap from half way or the bottom, and the chances are that an armful from one spot is equal to an armful from any other spot in the side of the mixing, so that at least one element of care is eliminated by the using of the machine.

The method of making the mixing can be gathered from the accompanying sketches. Fig. 1 shows the usual mode of procedure when the bale room is in the room above the mixing. In this case the bales are emptied upon the lattice of the bale breaker and the cotton passing through the machine falls down a shoot on to a traveling lattice near the ceiling of the room below. These traveling lattices are now becoming a necessary and intergral part of any mill that pretends to be modern, and scarcely any structural difficulty is great enough to prevent their adoption, so valuable in many respects are they found to be.

In the drawing we find arrangements made for four separate systems of mixing if they are required; at the same time the whole can be simply



No. 1

composed of one system when found necessary.

In reference to Fig. 1 it will be noted that the lattice immediately under the bale breaker conveys the cotton to either of two cross lattices. The elevation shows clearly how the cotton can be delivered on to the first cross lattice; in such a case the last cross lattice is stationary and its feeding lattice is reversed so that no cotton passes beyond the first opening; the cotton therefore falls upon the first cross lattice and as this can be caused to move in any direction, either the right or the left, mixing stack can be formed.

When the further mixings are wanted, the two feeding lattices are made to run in the same direction so that the cotton, owing to the peculiar way in which the lattices are put together, is carried over the first opening without falling through, and so reaches the second cross lattice, and is placed in whichever mixing stack is required. The divisions between the different stacks may be partitions of wood, or simply narrow open spaces. The reversal of the direction in which the different lattices run is one of a simple character, and is generally controlled by setting-on handles from the bale room, and is therefore under the direct control of the person in charge of the bale breaker.

The second illustration, Fig 2, shows the general method adopted when the bale room and mixing room are in the same room or on the same level. The cotton after passing through the machine is taken up to the ceiling lattices by two slightly inclined parallel lattices, and from these it is delivered to the lattices which feed the cross lattices. Six mixings are shown in this case, but, as in the last example, one or more can as readily be formed.

Now there will be no difficulty at all in seeing how immeasureably superior this method is to the old one of carrying the cotton to holes in the floor and dropping it on to the stack. Here we save a considerable amount of time and labor; we reduce the number of hands employed, and obtain a result in a more perfect mixing incomparably better than the old system. Some may say that exercise of care in the handling method cannot be improved, but it must be borne in mind that whatever can be done under that system can be equally as well done under the mechanical system, and done much quicker and more economically.

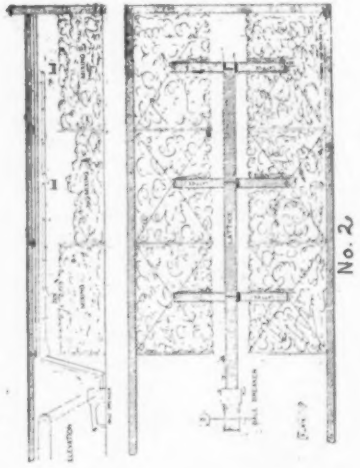
When the cotton has to be taken from the mixing stack and passed on to the opening machines, the person in charge rakes the cotton from the top of the stack to the bottom, and gathering it up carries it to the openings in the floor, through which it reaches the feeding lattices of the machines in the room below.

This is all right for small rooms, but in our new modern mills it is considered a waste of time and labor, and to save this, lattices are provided run-

ning along the stacks so that the cotton can be raked down and placed on the lattice in any part of the room and delivered to the openings without the necessity of carrying.

Before proceeding further, let us pause and inquire into the process so far as it has gone and see if the beginning of an answer cannot be discovered to the question, "why have mixing?"

In the first place, the bale is a hard compressed mass of cotton. It is very desirable that this should be opened to its fullest extent before it reaches that delicate piece of mechanism called the card; indeed, it ought to be understood that every machine through which cotton passes ought to serve the purpose of preparing the cotton so that the



next machine will do its work more efficiently. This introduces the pulling process, by hand or machine. Now we all know that directly the bands of a bale are loosened, the volume of the bale increases immediately to a large percentage of its former size, even exceeding 25 per cent. in bulk in very hard pressed bales. If a bale is left simply with its bands loosened for several days exposed to the atmosphere of the room no further perceptible expansion will take place. It was found, on the contrary, that, during a series of experiments that the writer conducted, a slight decrease took place in many bales, so that from this we may conclude that the air had little effect on the cotton so far as bulk was concerned.

After the cotton is passed through the bale breaker, it is in so loose a condition that its volume is considerably increased, and if equal volumes are taken of bale cotton and cotton from the bale breaker it will be found that, weight for weight, the cotton from the machine is eight times more bulky than previously. This is a great advantage and shows the favorable side of the pulling process.

The cotton is then formed into a stack, and if after a few days, comparison be made between the stack cotton and the bale cotton, it will be found that instead of being eight times more open, the relative volumes have been decreased, and this is still further emphasized when a large stack is taken for a comparison; as it was found that the density of the stack of cotton after pulling was only half what it was before it was put on the stack, namely, four times more bulky than the bale. In other words, the compressed bale was only expanded to four times its size when in the mixing stack ready for the opening machine; or the mere fact of forming a mixing had reduced its volume one-half what it was as it emerged from the bale breaker or the hands of the pullers. Moreover, the stack, instead of expanding, as one would suppose, through the beneficial tempering action of the surrounding air, decreased in bulk; thus showing that whatever other effect we obtain from a mixing, it cannot be said that it becomes more open or gives the cotton a character which makes the opening process the easier.

--In practice one manufacturer talks of making his cloth in the loom, by which phrase he means that its firmness of structure and its chief wearing qualities are acquired during and not after, weaving.

—Cloth analysis, although often considered dull work by a beginner in its study, is not without fascination to the more expert and experienced designer

Leno or Gauze Weaving.

Continuing from our previous "chats" in which we were confined to the "half-leno" weaves, we now take up the leno weave known as the "full-leno." As previously explained, to make a pure gauge we must have at least two picks, viz: a doup pick and a crossing pick continually repeated. Of course, we can have as many picks as we wish in either shed, but the point is that when the doup thread is raised to the right of the crossing thread for any number of picks, it must be passed immediately to the left of the crossing threads and held up for any number of picks and repeat. When there are any plain or other picks woven with the doup and crossing threads, it is called leno. The first "full leno" weave that we shall look into is a weave in which the doup and crossing threads weave plain, a number of picks before the doup thread is passed to the left of the crossing threads, then weaving a number of plain picks before the doup thread is passed back to the right.

Fig. 1 illustrates one of these weaves with one single thread crossing each single doup thread, and 9 picks of plain with the doup thread on the left of the crossing threads, then passing to the right of the crossing threads for nine more plain picks. You will notice that this pattern forms small squares of plain cloth by one or more dents of the reed being left empty and this single crossing of the threads. You will also perceive why the 18th and 1st pick of filling cannot come together. The 18th pick being a doup pick, the doup thread is raised to the right, and the next or 1st pick being a crossing pick, the doup thread is raised to the left; these two picks then form a gauge.

The next, or No. 2, we get a plain pick by allowing the standard harness to remain down while the crossing thread is raised. To get No. 3 pick the crossing threads are left down while the standard harness is raised as though for another crossing pick. Picks numbered 1, 3, 5, 7 and 9 are really crossing picks, and the slackner must be raised on each of these picks. The point aimed at in this weave, is to form a single opening or space, filling ways, similar to the space, warp ways, formed by leaving one or more dents of the reed empty.

You will notice that at pick No. 1 the doup threads have forced the crossing threads to change places. This is on account of each thread being at an equal tension by using only one beam. The effect of this weave is made more striking and neat, when running two single threads on each side of the square, with the weave two doup and two crossing picks. But, of course, this arrangement would require an extra set of doup harnesses. This weave is seldom used on account of its taking so many crossing picks to gain the effect of the single space; and as we explained before, it is the crossing picks that wear out the doups.

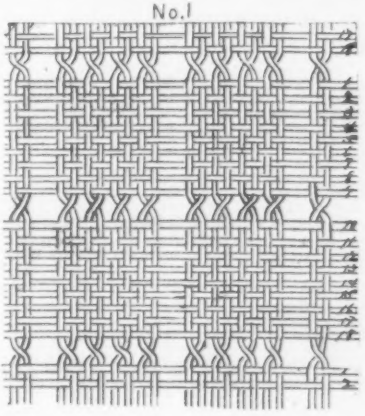


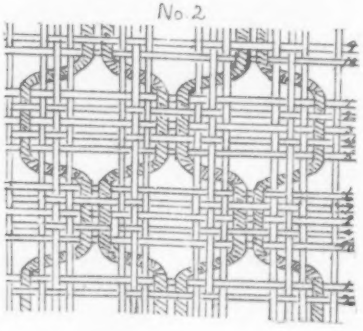
Fig. 2 illustrates another of these leno weaves. In this pattern we have three crossing threads and a heavy cord for doup threads with five picks of plain between each space. This weave is the same as in Fig. 1, as regards the crossing and recrossing of the doup thread and the weaving of plain, but instead of the crossing threads being forced into the place held by the doup threads, as in Fig. 1, they remain straight, on account of the doup thread running loose.

You will notice that a space is formed between the doup pick 10 and the crossing pick 1, also between cross-

ing pick 5 and doup pick 6. The idea in Fig. 1 was to get this space, but in Fig. 2 this space was not thought of. The idea in Fig. 2 is to get the cords to pass from side to side of the crossing threads at a very acute angle, so as to give the effect of squares formed by the doup threads.

I recall to mind a weave similar to that at Fig. 2. It was being woven on the double lift machine with the "Jumper" attachment. The cord was an 8-ply, 28's yarn, with three double ends crossing. This pattern wove very bad, the crossing threads breaking out all the time. I noticed that they always broke at the time the cords were passing from one side to the other. So we added two more plain picks, making six picks each, before the cords were passed to either side, and we had no further trouble

No. 2



with it. The reason is simple. You will readily see that if we added one more plain pick, after pick 5, and before the cords are passed to the left, the cords would be down on that pick; add another plain pick, after pick 10, and the cords would be down on that pick. So that these two extra picks changed the weave from a "full leno" to a "half-leno" and so could be run on any dobby without the extra attachment. DOUP.

[*Especially for the Textile World.*]

Textile Designing.

Lecture by V. I. Cumnock, superintendent of the Boott Mills, before the Lowell Textile School, Lowell, Mass.

Textile designing, in a broad sense, covers the entire field of weaving in all its branches, from the plain print cloth to a brocaded silk or tapestry. It matters little whether the design be an organization of a plain woven fabric or a beautiful damask table cloth. It requires on the one hand a knowledge of weaving and the cost of the different yarns entering into the plain cloth and the effect of such yarns when combined, and on the other hand a knowledge of the effect of a certain number of threads on the desired size and brilliancy of the pattern.

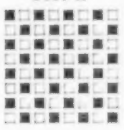
Taking away for the moment all idea of color in the design, the matter resolves itself into two systems of threads; one system running parallel to the selvage, called the warp, and the other crossing at right angles, called the filling or weft. In the base, or plain cloth, every other warp thread is raised, allowing the filling to pass between the threads raised and those left in the lower position. Once the filling having crossed, by lowering the threads which were raised and elevating the threads over which the filling has just passed, the series of bendings over and under the filling of the alternate warp threads form this plain weave or base.

With the grouping together of two or more warp threads, or whenever a warp thread is allowed to depart from its regular upward and downward movement, there then begin on the face of the cloth certain other intersections which form figures, the length and breadth as well as character depending on the number and the time that the different warp threads are suspended or allowed to stay down.

It will therefore be seen that in all woven fabrics, the figure is produced by raising the warp threads, or allowing them to move out of their regular intersections, and that the edge of the figure is generally a series of steps, so that while to the eye, curved lines may appear, yet these curved lines are simply right-angled intersections of the warp and filling. You will thus see that in forming a figure, there are certain limitations as to the directions which the lines can be made to take, as in the plain cloth, the lines appear

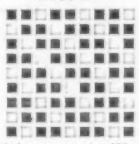
only at right angles to each other, and when there are but a few threads to the inch, say sixteen of warp and sixteen of filling, any change from the regular order of intersection will make a figure at least one-eighth of an inch in width, the length depending upon the number of times the filling is

FIG. 1.



Plain.

FIG. 2.



3 harness twill.

allowed to pass through the warp while in this state. Thus, to get lines which appear to be circular, one must use many more than sixteen threads to the inch, and as a matter of fact, the greater the number of threads per inch, the more curved the lines can be made to appear. Therefore upon the organization of a fabric depends largely the delicacy of the figure. By organization is meant the number and size of the warp and filling threads per inch. You will further see that upon the number of different warp threads one controls, depends the size and extent of the pattern.

That kind of weaving in which one practically controls individually, more or less, all of the warp threads, and can raise or lower them at will, is called Jacquard weaving, taking its name from that of the Frenchman who invented the part of the loom used in raising this large number of threads. Under this head comes the carpet, table cloth and napkins, elaborate furniture coverings and all dress goods which have more than from twenty to thirty threads in the pattern.

It is almost impossible ever to mistake a Jacquard for a dobby weave. The dobby weave takes its name also from the head or that part of the loom which raises the harness. The term "dobby" is a corruption of the compound-word "draw-boy." This was the occupation in the very old style of fancy, hand-loom weaving of one who raised the harnesses which were held in place by cords running through a board like an inverted Jacquard comber board. When the filling had been beaten in and the weaver was ready for the next pick, the draw-boy would take hold of certain cords and thus raise the harness to form the next shade. He probably had some sort of a draft by which to do this. The name was corrupted into "do-boy" possibly spelled d-o-u-g-h after some careless youngster who made too many miss-picks. When later the machine which did this by power was invented, it was called dobby.

This weave generally allows the designer from twenty to thirty different threads, at most, with which to form the pattern, and therefore limits the pattern to right-angles and a diagonal at 45°, which angle in turn can be slightly varied by using different twills.

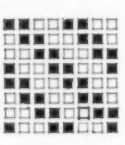
Going back to the plain weave, Fig. 1, one-half of all the warp threads are lifted at once, allowing the filling to pass under, then the other half is lifted, thus requiring two separate holders or harnesses, as they are technically called, and as other different warp threads are used, other harnesses or holders are necessary. Thus it will be seen that as many different threads as are used to form the pattern, just that number of harnesses will be required.

It is not my purpose to go into the different weaves, as doubtless you are all more or less familiar, at least in name, with the gradual growth of the plain cloth into the three harness twill, Fig. 2, where three threads are used one after the other to form a twill, or stepped intersection, to the four harness twill of a napped domet (Fig. 3); the five harness twill and broken twill of the sateen, largely used in making coarse goods (Figs. 4 and 5), and the six harness twill of a woolen suiting, (Fig. 6), but rather taking the conditions which surround the designer, and the tools with which he has to work, to draw some lessons which may be of benefit.

One great difficulty always facing a young, and in fact all designers, is the fact that to a certain extent, originality is barred. There are certain staples even in so called fancy goods and

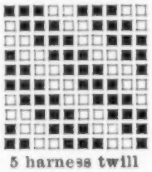
In almost all cases the organization which largely fixes the price, limits the amount of pattern or design which can be put upon that fabric, and after a cloth is woven it must have a place in the trade, else it is not wanted. I would say here that my remarks have more special reference to staples than to novelties all along the line, for

FIG. 3.



4 harness twill

FIG. 4.



5 harness twill

there are "Klondykes" in designing as well as in other walks of life.

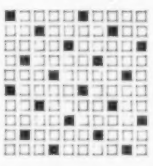
One other bar to originality at present, is the fact that we are not, as a nation, leaders of the styles which appear season after season, either in character of design or color, and therefore being thus limited, we follow the importations from other countries. It is to be hoped that the Lowell Textile School, and others of similar character, will in time give to the selling and buying part of the country, such good ideas of American workmanship that when a piece of cloth has the words "Made in the United States" stamped upon it, that that will be sufficient to give it the preference, and there is no reason to doubt that with our modern looms, which are without doubt the best in the world, we can produce fabrics equal to any. It will rest, however, with the younger, educated designer to make for that loom a fabric worthy of its production.

One can hardly expect to master all the different requirements of designing, as a thorough knowledge of the yarns which go to form the cloth, as well as an eye for color, and a clever pencil, with the draftsman's accuracy and the artist's skill, is required. Therefore the art of designing will always be one of specialists, one making the graceful drawing, one the coloring, another adapting the whole to fit the loom and organization, thus producing a fabric which can be sold at the proper price, containing all the above skill. Each of these specialists must, however, be grounded in the same fundamental principles, and again is seen the necessity of this school with its art, weaving and spinning departments.

The artist must know the width of the cloth, otherwise his bird would reach from selvage to selvage. The colorist, the chemistry, and cost of his color, and the third, his looms and yarns, the cost of producing such design and how to make it fit the market into which it is intended to go, and at the same time each being dependent on the others for certain parts of the design, the knowledge must be common to them all, and the more intimate each is with the work of the others, the less chance there is of badly proportioned and oddly colored designs. This of course applies only to the more complicated cloths, and yet the principle certainly holds good with all designing, and one should bear in mind that at any time he may be called upon to fill any one or all of these requirements, and should take great care to have the foundations so well laid, that at any time it can be developed as the occasion may require.

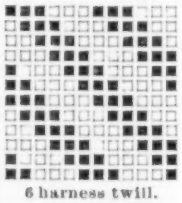
When one thinks that within a mile's radius of this place, all of this kind of art is applied in the most practical form, and to certain extents is open to any practical worker who may apply, and can be obtained with a little energy, it does seem as if the school were well located, and that a certain practical finish can be here obtained

FIG. 5.



5 harness sateen.

FIG. 6.



6 harness twill.

which it must be difficult to obtain elsewhere.

By far, the largest proportion of cloth manufactured, is in the plain or base weave. This is of necessity so, because of the cheapness of this weave compared with all others, and therefore the designer has little to do

with it, other than at times he may be called upon to construct an organization which shall fill the purpose of some customer as to price and quality. It includes all plain woven fabrics, from the coarse export sheeting to the fine Indian muslin, regardless of any coloring matter put on it by the printer. The larger part of the printed goods are plain woven fabrics as is also the case in ginghams, although in the latter, colored threads are introduced to form the design, and an examination of ginghams will show that almost without exception the colors are either in parallel lines, or at right angles to one another.

(To be continued.)

Cotton Carding.

ARTICLE XII.

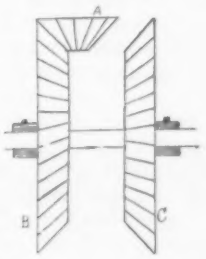
The roving must be wound on the bobbin spirally and in layers. This is done by running the wave, which holds the bobbin gears, bolsters and bobbins, up and down, the eye of the presser maintaining the same level, while the bobbin passes by the eye of the presser from top to bottom, and vice versa, besides revolving on its own axis.

When the roving has covered the bare bobbin as near the top or bottom as is desirable, it is necessary for the bobbin to change its course and travel in the opposite direction. This is done by various methods, but the principle is the same in all speeders. The reverse motion is made by what are termed the twin gears, which are two bevel gears set face to face. The twin gears derive their motion from a small gear, as shown in the accompanying illustration.

"A" revolves continually in the same direction. When it is necessary to change the direction of the traverse, the twin gears "B" and "C" slide horizontally; "B" sliding out of gear and "C" engaging with "A," thus changing the direction of the traverse.

The twin gears are made to make this change in various ways, each maker having a way of his own, but the result is the same in all machines. Another change takes place at this time. The distance travelled by the traverse is lessened each time the traverse changes, the difference being as much less as the diameter of the strand of roving being wound on. This makes a taper on each end of the bobbin. There is still another change operated in connection with the change of the traverse, that is, the changing of the position of the cone belt, which is operated by the rack gear turning and moving the rack on which the shippers, through which the cone belt passes, is fastened, thereby decreasing the speed of the bobbin to accomodate the larger diameter of the bobbin after a layer of roving has been wound on.

The functions performed by the rack gear is to regulate the distance



travelled by the shippers each time the traverse changes. This gear is changeable so as to be applicable to any hank roving. If the roving is to be made coarser, the shipper must move the belt farther towards the opposite end of the cones each time the traverse changes, because the diameter of the bobbin will be larger, with each successive layer, than on a finer hank roving. The rack must be set so as to run without stretching the roving at the start, then regulated by the rack gear as the bobbins fill up. The tension of the roving is a very important factor in producing good even yarn and cloth, and should on no account be neglected.

As shown in my last article, there must be some way of winding on the bobbin just what is delivered from the front rollers. If allowed to run too tight, the roving will be weakened and, though it may run all right in the card room, it is apt to break in the

creels in the mule or ring spinning room. Even if it does not break in the creels, it will give trouble for the weaver,—such as filling, breaking and catching on again, leaving, perhaps, a foot or more without filling, in every few inches of cloth woven, for which the loom fixer gets blamed a good many times. It will, if made into warp, cause the threads to keep snapping, besides producing wavy cloth.

It is a very common practice for section hands to run the ends a little tight, because they imagine the speeders will run better. Speeder tenders also have a very bad habit of tightening their ends, especially if their speeders do not run as well as they think they ought to.

If the section hand would look to his cone belts and see that they were not too greasy or too loose, he would find the source of his trouble; but, unless the overseer is there to see to it, this is apt to be neglected. It is much easier to turn the rack back a tooth or two, than to take out a small piece of the cone belt. But the careful man will see that, every time he changes a frame from one hank to another, it is right at the starting point.

It is a good rule to run the ends as loose as possible without having them come out of the flyers. Proficiency in this can only be acquired by practice and using good judgment. When the cone belt is adjusted at the start, it must not be changed throughout the set only by changing the rack gear. If running too tight, the gear must be changed so as to move the rack more each time the traverse changes; if too loose, vice versa.

Another source of annoyance and inconvenience is that of buying bobbins in small lots from time to time, and, unless the overseer is careful, he will have half-a-dozen different sizes of bobbins before he knows it. That is, the diameter of the barrel of the bobbins will vary from an eighth to a quarter of an inch, which will make it impossible to properly adjust the speeder. I have found it a good plan to have an iron bobbin turned to the same diameter as the bobbins I am using, and send it as a pattern with each order for bobbins. When I receive the new bobbins I gauge each one, and if any are found too large or too small, I re-reject them, and send them back to be replaced by right-sized ones.

The lay gear must not be changed with impunity, as there is a certain affinity between the rack gear and the lay gear, and while the rack gear may be changed without disturbing their relations, the lay gear cannot be changed without changing the rack gear. Therefore, it is well to have a standard lay gear for each hank, and regulate the rack to that standard.

I take for my standard, 29 coils to the inch on the bare bobbin, on 10-hank roving. Suppose, then, I want to change to another hank, say 15-hank; I take the square root of 15, which is 3.87, and multiply by 29 (the coils per inch on 10-hank), and divide by 3.16 (the square root of 10-hank). Thus $3.87 \times 29 \div 3.16 = 35.5$ coils per inch required; or if I know what lay gear gives me 29 coils on 10-hank, I say: if 35 lay gear gives me 29 coils per inch, what gear will give me 38 coils? It will take a smaller gear. Thus $35 \times 29 \div 38 = 26.71$ gear, put on a 28 lay gear.

DOFFER.

—As regards the physicial action of caustic soda on the cotton fibre, and the time occupied thereby, with lye of 52° Tw., contraction takes place very rapidly; after the lapse of one minute the shrinkage amounts to over 23 per cent., whilst after thirty minutes it becomes complete with 29 per cent., these figures being, of course, only relative. Whether the fibre be allowed to contract or be kept by some means or other expanded during the action of the alkali, the same chemical change takes place, namely, formation of alkali-cellulose of the formula $C_{12}H_{20}O_{10}$ $2NaOH$; the final product, however, is not cellulose, but a hydrate of the formula $C_{12}H_{20}O_{10}$, the increase in weight being from 4.4 to 5.5 per cent. This change is the essential feature of "mercerization" proper, contraction and other physical changes being but incidental.

WOOLEN DEPARTMENT.

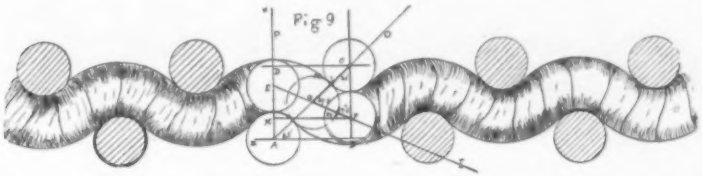
Science and Practice of the Construction of Woven Textures.

F. BRADBURY.

(Continued from December.)

In the next example assume the angle formed by the warp to increase from 45° to 60° (see Fig. 10). A further decrease in the angle produced by the weft will readily be observed, it being now 15° (Fig 10) instead of 22.5° as in Fig. 9. The angle of 60° may be taken as the limit of curvature which either set of threads can make in single cloths and when both sets of threads form unequal angles.

Construction: take any suitable point "x" and draw a horizontal line "x y" unlimited towards "y." In "x y" take



any point "A," and with "A" as centre and radius equal to half the diameter of the warp, describe a circle which shall represent the diameter of the warp. From the centre of circle "A" draw a straight line, "A P," perpendicular to "x y" and unlimited towards "P," also from the same centre draw a straight line "A O" unlimited towards "O," and making an angle of 60° with "A y." Further, with "A" as centre and radius equal to the radius of circle "A" plus one diameter of the weft, describe an arc of a circle "m n." In "A O" take a point "C," equal in distance to the radius of circle "A" from the arc "m n" at the point where "A O" passes through "m n" and describe a circle such that its circumference touches the periphery of "m n." Also from the centre of circle "C" draw two straight lines parallel to "A y" and "A P" cutting "A P" in "D," and "A y" in "B" respectively.

Then, to find the angle produced by the weft, find the centre of the weft thread in the lines "C B" at "F;" "A D" at "E;" and "A C" at "G." Join "E G F" and produce "F" to "I." From the point "F" draw a straight line parallel to "A B" and meeting "A D" in the point "H." Then the straight line "E F" produced to "I" represents the average inclination of the weft thread with the horizontal line "F H" or "x y," which will be found to be one of 15°.

Proof: In the triangle "A B C"
angle "A B C" = 90° by construction,
angle "C A B" = 60° by construction;
therefore "A C B" = 180° − (90° + 60°) = 30°.

And in the triangle "G C F,"
The side "G C" = ½ diameter of warp plus ½ diameter of weft (construction)
And the side "F C" = ½ diameter of warp + ½ diameter of weft (construction).
Therefore, the side "G C" = the side "F C"
And the triangle "G F C" is isosceles, and the angles at the base of an isosceles triangle are equal.

Then, because the three interior angles of a triangle are together equal to two right angles, the angles "C G F" and "C F G" are together equal to 180° − 30° ("G C F") = 150°.

Therefore the angles "C G F" and "C F G" are each equal to 150 ÷ 2 = 75°.

Further, the angle "H F C" is a right angle (construction), of which the angle "C F G," forms a part.

Therefore the angle "H F G" = 90° − 75° ("G F C") = 15°, which represents the average angle produced by

the weft with the horizontal line "H F" or "x y," when the warp forms an angle of 60°.

The length of the straight line "A B" indicates the fractional part of an inch which one diameter of warp plus one intersection of weft occupies in the finished piece, consequently the denominator of such fraction represents the number of warp threads per inch which the fabric would contain.

The following is a solution of the problem:

Distance "A C" = 1-60 + 1-60 = one-thirtieth of an inch.

Let "x" = distance "A B" in inches, and since the angle "C A B" is one of 60°:

Base ÷ hypothenuse = "A B" ÷ "A C" = cosine of angle "C A B."

Cosine of 60° = ½;

therefore $x \div 1\text{-}30 = \frac{1}{2}$

and $30x = \frac{1}{2}$.

Hence $x = 1 \div (2 \times 30) = 1\text{-}60$ part of an inch.

Consequently if a cloth is to be made under conditions such as above it must contain 60 threads of warp per inch, and the number of weft threads per inch would be rather less than is represented by one diameter of warp plus one diameter of weft, inasmuch as the weft is somewhat bent out of the straight line.

It might be necessary to repeat here that these two examples (Figs. 9 and 10) have only been selected to demonstrate the theory, that as the angle increases, the cloth must contain relatively more threads of warp or weft per inch, or, inversely, an increase in the number of warp or weft threads causes a relatively greater angle of curvature in the respective set of threads in which the increase takes place.

The chief factors which cause the two sets of yarns to produce unequal angles in a fabric may be enumerated as follows:

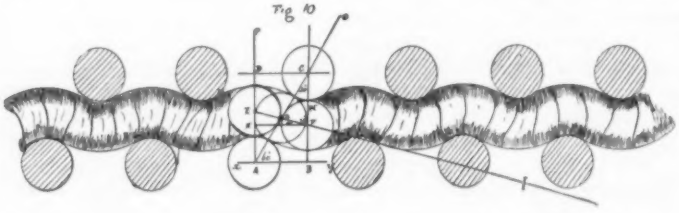
1. A difference in the diameters of the two yarns, in which case their relative bending powers would be in the ratio of the cubes of their diameters.

2. A variation in their relative powers of resistance, due to a difference in quality or material.

3. The weave structure.

4. The construction of the fabric so that it shall contain relatively more threads of one set than of the other set, warp or weft, than would be obtained by the application of the principle involved in formula II. previously demonstrated.

In proceeding, we shall now consider the principle underlying the construction of those fabrics in which the warp threads lie perfectly straight, while the weft performs all the bending. An illustration of the structure

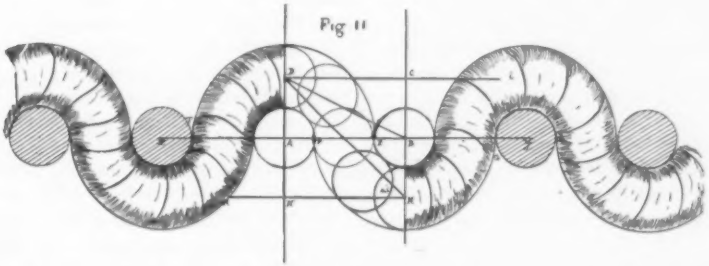


of such a fabric is shown by a cross section through the warp at Fig. 11.

An examination of the construction of this diagram not only shows the warp threads to lie in a perfectly straight line, while the weft does all the bending, but it also reveals the average angle of inclination to be 45°. For example, take any point "x" and from "x" draw a straight line "x y," but unlimited towards "y." In "x y" take any point "A." Then with "A" as centre and radius equal to half the diameter of warp, describe a circle representing the diameter of the warp; again with "A" as centre and radius equal to half the diameter of the warp, plus one diameter of weft, describe a semicircle meeting "x y" at "T" and "E," respectively. Further in "x y" take a point "B" at a distance from "E" equal to the radius of the circle circumscribing point "A." Then with "A'" as centre and radius "E B" describe a circle to represent the second

warp thread. Further with "B" as centre and radius "A T" or "A E," describe a second semi-circle, so as to meet "x y" in the points "F" and "G" (repeat the process to show a greater length of weft interlacing with the warp). Then to show the average inclination of the weft proceed as follows:

From the points "A" and "B" draw perpendicular lines to the centre of the weft thread in its highest and lowest position, viz: "D" and "H" respectively. Then from the points "D" and "H" draw straight lines "D L," "H M" unlimited towards "L" and "M" respectively, and each parallel with "x y" or "A B." Produce "D A" to meet "H M" in the point "N," also "H B" to meet "D L" in the point "C." Then because the side "A D" equals



the side "B H" (each being equal to half the diameter of the warp plus half the diameter of the weft) and also "B C" and "A N" being equal (each meeting parallel lines with "A B" and of equal distances from "A B"), then the sides "D A" and "A N" are together equal to the sides "C B" and "B H."

Further, because the straight line "A B" equals two diameters, viz: half the diameter of warp plus one diameter of weft, plus half the diameter of warp ("A F" + "F E" + "E B"), therefore "A B" equals "D N" or "C H," and because "A B" equals "D C" or "N H," therefore "D C" and "N H" are each equal to the sides "D N" or "C H."

Again, because the angle "D A B" is a right angle (construction) and since the straight line "D N" falls upon the parellel lines "x y" and "M H," the interior angle "D N H" is equal to the exterior angle "D A B" or "D A Y." Join "H D" (the lowest and highest positions of the centre of the weft thread), then the line "H D," which represents the average angle formed by the curvature of the weft makes an angle of 45° with the horizontal line "x y" or "A B."

Proof: In the triangle "D N H," because sides "D N" and "N H" are equal to each other (proved) the triangle "D N H" is isosceles, therefore the angles "N D H" and "D H N" at the base "D H" are equal; and since the three interior angles of a triangle are together equal to two right angles, and the angle "D N H" is a right angle (proved), therfore angles "N D H" and "D H N " are together equal to

180° — 90° ("D N H") = 90°;

therfore angle "N H D" = 90° ÷ 2 = 45°.

From the construction of the foregoing example it will be clearly manifest that the distance apart of the warp threads at each intersection is equal to one diameter of warp, plus one diameter of weft, viz: 1-60 + 1-60 = 1-30 or 30 threads of warp per inch (assuming the diameter of the warp and weft threads to each equal one-sixtieth part of an inch as in the previous examples. The number of weft threads per inch that would be contained in a fabric constructed under such conditions would be equal to the denominator of the fractional part of one thread in inches, because if the warp threads lie straight, the weft threads would touch each other.

(To be continued.)

—Textile designing, in a broad sense, covers the entire field of weaving in all its branches, from the plain print cloth to a brocaded silk or tapestry.

T. R. Ashenhurst's Comments on F. Bradbury's Propositions.

Editor Textile World:

Adverting to the comments by T. R. Ashenhurst, in the November issue of your magazine, I have much pleasure in replying to his or any criticism that is or may be forthcoming, inasmuch as such will give me the opportunity to more clearly show to those interested in the trade, the amount of time and thought which I have devoted to this work. In so doing, many points will no doubt be brought to the front which otherwise would have remained dormant, being, to some extent, out of place in the "article" itself.

First, your correspondent takes objection to my statement "That the subject of the angle of curvature of warp and weft, together with its subsequent influence upon the construction of woven fabrics, has not, as far as I can discover, been fully explored, etc." Are your readers and the public to assume that he has fully explored this section of the work? If so, then I take exception to his assumption. When you have published in your excellent magazine the material which I have already sent you, apart from what is to follow, I venture to presume that Mr. Ashenhurt's first objection will have vanished. Further, when I draw the above subject to a close, I believe there will be pastures new, and unlimited fields of thought and research left for other inquiring minds.

Second, Mr. Ashenhurst objects to my assertion, "When warp and weft form equal angles and when the cloth is constructed according to natural conditions, the angle formed by the weft with a horizontal line drawn through the centre of the warp threads is one of 30 degrees, and not of 60 degrees, as stated in some text books." He also regards this assertion as a direct slight upon himself. I might say just here, that no such slight was intended for anyone, and, moreover, I fail to see how the indicating of a technical error made by previous writers can be interpreted as such. I leave your numerous readers to judge if he is justified in making such a statement.

Further, since Mr. Ashenhurst assumes that he is the only person to whom my remarks can apply and has therefore contested the point, I have much pleasure in answering him. I observe in his notes on cloth construction that he only supplies one diagram showing the angle of curvature, and from which he obtains his subsequent results. I further observe that he is speaking of those cloths in which the warp threads lie perfectly straight and the weft performs all the bending. But, for reasons best known to himself, he only supplies an illustration which shows both warp and weft to form equal angles, and from which he makes mistaken deductions. In a friendly spirit I would suggest that he would do well to revise this section of his work.

And further, Mr. Ashenhurst confuses the student by stating that the angle produced is one of 60 degrees. The angle of 60 degrees to which he refers is the one presented to the eye, he says. Now, it is clearly manifest to every thinking mind that the angle produced by the weft or warp which is presented to the eye is an ever-changing factor, that is, fabric may be seen as it rests upon a table, or as it passes over a perch, or is made into suitable garments as worn by the sexes. Consequently, the angle presented to the eye, depends upon the distance which the observer is from the object, together with the height of his person. Therefore his basis of assumption is a fallacy. The angle of 30 degrees, to which I refer has a definite relation with the warp, and, no matter in whatever position the fabric may subsequently be placed, the same relation is maintained, and consequently the basis of my system of measuring angles is an unchanging factor and must therefore be most reliable.

Finally, I have all through my article pursued an entirely independent line of thought. My methods and work are original. The article is a result of many years' practical experience in yarn preparing, designing and manufacturing of worsteds, woolens,

figured and mixed goods, together with several more years as a specialist and instructor in the manufacture of woven fabrics. I have at my command an indefinite number of makes of fabrics, with which I can compare my theoretical results. In attaining these results, Arithmetic, Algebra, Geometry, Trigonometry, Chemistry, Photography and the microscope have been my principal assistants.

In your November issue, and in which your correspondent's comments appear, the inquiry in his last paragraph, is partly answered.

F. BRADBURY.

How to Design a Cloth.

BY THOS. R. ASHENHURST.

(Continued from December.)

So far, much that has been said is simply a reiteration of what appeared in my late article under the head of "Relation of Patterns to Structure," but it is necessary to have a clear understanding so as to follow the practical application.

Then to return to the plain cloth. It is desired to form a rib in the direction of the warp. As already pointed out, the warp should be thick, or a number of threads together and with corresponding wide spaces between them. The weft should be fine and as close as possible. Then, where is the starting point? There may be one of two. First, determine the number of ribs per inch, or second, the counts of material you are about to work with. I will deal with both propositions, and on the general principles laid down in previous articles.

Suppose the cloth is to be made with cotton warp and worsted weft, and it is desired to have 48 cards per inch. Then it is necessary to find the counts of warp to give a good rib, and on the assumption that the space between the ribs is equal to their diameters, these would be 48 ribs and 48 spaces per inch, equal to 96 diameters of one thread, or a combination of threads forming the rib. Then, following the rules, or rather reversing, already laid down, square the number 96. Thus, $36 \times 96 = 9216$, and this divided by the number of yards per hank ($9216 \div 840$) $= 11$ nearly. So that the counts of warp should be about 11s or 2-20s, or two threads of 2-40s would be as near as the ordinary commercial yarns would permit.

Then, to determine the counts of weft, the degree of fineness of the cloth will be an important factor, not only as to the number of picks per inch, but also as to a possible variation of the number of cards per inch. If the angle of curvature of the weft is to be one of 60 degrees with a vertical line, which I have demonstrated over and over again to be the best for a good cloth, is to be maintained, then all the dimensions must be taken into account. Then to determine the number of picks per inch find the diameter of the weft thread by extracting the square root of the yards per pound. Suppose the weft to be 48s worsted, then $\sqrt{(48 \times 560)} = 163$. Therefore 163 threads would lie side by side in one inch, but obviously, to put that number of picks per inch in the cloth, would make it too solid. Then a general rule may be adopted, viz: half the number of the diameters that would lie side by side, plus ten per cent. for solidity, and a very stable cloth will be the result. For heavier cloths, this may be increased somewhat, and for lighter cloths decreased, but there is danger in going too far in either direction as the cloth is liable to be uneven either from overcrowding or insufficient material.

Now to take the second proposition, and deal with the same counts of warp so as to make the matter clear and easy of comparison: 2-20's warp or two ends of 2-40's is used, then the diameter of 2-20's is $\sqrt{(840 \times 10)} = 92$ ends (nearly) per inch, and $92 \div 2 = 46$ ends and 46 spaces per inch. There is a difference here between the 2-20's, or 1-10 and the 1-11's, which the first calculation gives; then the rest of the operation is as in the previous case. But there is another operation which should not be overlooked. The designer should know the weight of cloth he is going to produce and should never put one into the loom without knowing it. Then all he has to do is

to work in the usual manner, the weight of a square yard, or the weight of a yard of any given width, so that he can compare with any known cloth, and if too heavy or too light alter it to meet the requirements.

The weight of cloths may be altered in several ways: as by altering the number of picks or ends per inch, or a combination of the two; but in any of these methods the character of the cloth will be altered, probably, at the same time. In many cases that may be desirable for the development of some special feature, more especially in fancy goods, but there are cases where every characteristic of the original should be retained, and a complete knowledge of the method of changing weight and retaining the same character is of inestimable value in assisting in the development of some special feature.

It is obvious that any change in weight, where the same character of structure is to be maintained, must be governed by the relative diameters of the threads, and it is in this connection quite as much as in the first building of a cloth that the value of a knowledge of the diameters of threads, or a ready means of finding those diameters, comes in.

As pointed out in previous articles, the diameters of threads vary as the square roots of their counts, therefore it follows that the finer a cloth is the lighter it is in weight, and the coarser it is, the heavier in weight.

Take a rough comparison. Lay a number of bars of iron four inches in diameter at a distance of four inches apart to cover a given area. Lay another number of bars of two inches in diameter at a distance of two inches apart to cover the same area. The relations between the bars and the spaces which separate them will be the same in both cases, but the relative weights of the two sets of bars will be as two to one, simply because the relative weights of the two sets of bars respectively will be as the squares of the diameters. Thus $4^2 = 16$, and $2^2 = 4$, or as four to one, bar for bar. But the space between the bars being equal to their respective diameters, the relative weights in the aggregate is reduced to one-half, thus $\frac{4}{1} \div 2 = \frac{2}{1}$. Hence the relation of bulk and space being the same, the relative weights must be as 2 to 1.

The counts of yarn being indicated by the number of hanks of a given length per pound, or by the yards per pound, the higher the counts and the finer the thread,—except in one or two systems of counting—these counts represent the relative weights, therefore their sectional areas will serve as a basis for their relative diameters, and this must be in the ratio of the square roots of their counts.

Now suppose a cloth has been designed, and it is too heavy or too light, and it is necessary to alter it so as to bring it to a given weight, and yet retain every characteristic of the original. It is obvious that the relations between the diameters of the threads and the spaces between them must be maintained, and that the relations of warp and weft must also be maintained; otherwise there must be a change in the character of the cloth. Now suppose the warp to be 20's in any material, because so far as the principle is concerned there is no difference in the treatment of the subject, and that there are 48 ends per inch, and the cloth is too heavy by, say, one-sixth. Then both the counts and the number of ends per inch must be altered. If it must be reduced in weight one-sixth, there must be a finer yarn with a diameter of one-sixth less than the original, or in the ratio of 6 to 7. Therefore the proposition will stand as $6:7::\sqrt{20}:\sqrt{x}$, or what is the same thing as $6^2:7^2::20:x$, which is a little over 27 as the required counts. But the ends per inch must be altered now to correspond with this, and this must follow on exactly the same lines, that is, the square roots of the relative counts. Then as $\sqrt{20}:\sqrt{27}::48:x$, or in another form as $20:27::48^2:x^2$, or reduced to its simplest form as $6:7::48:56$, so that 56 ends per inch of 27's will give a cloth of exactly the same character, but one-sixth less in weight than 48 ends of 20's will give.

If the cloth is to be made heavier, it requires to work in the opposite di-

rection, lower counts and fewer threads, and the result must be correct because it is based upon the strictest scientific principle.

Wool Carding.

It should be one of paramount importance with managers and proprietors of our woolen mills, to engage a man to take charge of their carding who can, on good medium or low stock, gauge his stock for the amount of drawing required to produce the proper weight and size of yarn that goes to form the fabric that it is intended to make, in order that it may be produced at a mimimum cost. Even if a mill is running on strictly all wool goods, there is something more wanted than perfection of plant. Competent foremen and good help generally will produce the best and largest production, which means cheapness and profit. Of course there are many vexations and trying things to be encountered in most every department of a woolen mill, at certain times, but it is a good plan to keep a sharp eye to those things that are liable to bring the driving belt onto the loose pulley, and see that your lots are on hand in time in order that your machines do not wait for one another; see that your cleaners, grinders or your second-hand take every possible advantage of time or occasion to do their work so as to make unavoidable stoppages as short as possible.

But it is never good policy to keep the belt on the tight pulley when a card is really making poor work, in order to keep the spinner at work and his machines supplied with roping. A full rack of poor roping is the worst recommendation a carder can have.

If a card room is running medium or low stock, much of the unevenness and consequent breakage results from two full or too dirty cylinders and doffers. Strenuous efforts should be made to have every part of a carding machine clear itself as much as possible. As every good carded knows, there are very many little things throughout the card room that have a tendency to make bad work, and one of the many things which cause the roping on the finisher to break and make tender work is the careless handling and neglect of the doffer-rings. These should be cleaned very carefully, and it is good policy for the carder, or his second hand, to do it himself, as it is very seldom that you can get a hand that will always be faithful in these important details.

The doffer-rings are very often jammed in cleaning, or by the tender's carelessness when getting up the roping, if it should chance to wind around the rings as wipe-rolls; and often times the operative, in trying to free the rolls, is apt to jam the rings. When they are injured in this, or any other way, do not let them run, even if the jam is ever so slight, as the consequence will be shown when the roping comes to be drawn out upon the spinning frame.

There are different opinions as to the proper speed for the different parts of the carding machine. There are certain governing rules to go by. Care should be taken that workers are not run too fast, especially on the finisher, for medium work. We should run the workers, say, seven revolutions on the breaker card, and on the finisher card six. The speed of the cylinder must be governed by the judgment of the carder and according to the grade of stock. If the fancy is running too slow, the card will carry too much stock just then, as if the fancy were set too far off, and if it is running too fast, it will throw out the stock and make unnecessary flyings.

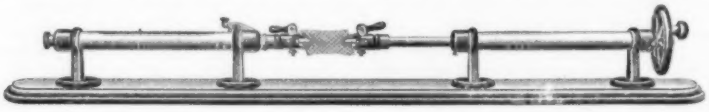
In regard to setting fancies it is better to set them by the sound, and have them touch very lightly. On ordinary work on the first breaker use a No. 33 steel wire for the cylinder, and a No. 34 steel wire for the fancy; and if the machine is properly adjusted, satisfactory results should be obtained. Judgment must be exercised on the part of the carder in putting on the proper number of wires to meet the requirements of the stock. G. B.

—One great difficulty always facing a young and in fact all, designers, is the fact that to a certain extent, originality is barred.

The Hercules Cloth Testing Machine.

It is well known that cloth furnished to the United States government, and indeed in many other important contracts, must comply with certain specified requirements as to breaking strength, and while in ordinary commercial transactions the exact breaking strength of a fabric has seldom been specified in amount of pounds strain it will stand, the well known crude thumb and finger test is almost always applied to determine if goods come up to requirements.

Up to the present time, the machines made for determining the pounds of breaking strength were very expensive, and beyond the reach of most mills and cloth buyers, with the result that cloth manufactured to stand a certain strain was unable to be properly tested, whereas it would be very desirable to know what its breaking strength was before it left the mill.



One of the most serious causes of annoyance between manufacturer and buyer to-day is in the frequent claims for allowance for all manner of causes, not the least among which is the strength of the fabric. Each year sees manufacturing approaching a degree of exactness which hitherto has not been necessary, and an exact knowledge of the strength of fabrics has come to be an important consideration. Every yarn manufacturer has to know the breaking strength of the yarn that he manufactures, and the buyer carefully tests it on his own account. Cloth examiners and expert woolen men realize that the thumb and finger test for trying fabrics is almost useless, for after breaking one or two pieces, the muscles become weakened, and the following tests are necessarily uncertain, and indeed, any such tests are largely a matter of opinion and guess work, whereas a proper machine test is conclusive.

The Hercules cloth testing machine is designed to supply the demand for a convenient and reasonable priced machine for properly and accurately testing the breaking strength of fabrics, such as cassimeres, kerseys, cheviots, serges, Italians, dress goods, etc. The illustration shows at a glance the principle on which the machine is operated, its simplicity and convenience. The grips are so made that the fabric is ruptured within an area of a square inch, leaving either side intact, and thus showing the exact strain a square inch of the fabric will stand before breaking, an indicator registering the amount of pound strain required to rupture the fabric. Practical examiners and woolen men who have used the machine, express themselves as well satisfied with the accuracy and fairness of the test, which settles all dispute and argument conclusively.

There have been several previous attempts to put a machine on the market for this purpose, but as far as we have known, they have been unsatisfactory. The Hercules machine seems to fill the bill. It is made of polished brass and steel, Japanned castings, set on an oak base 36 inches long, 5 inches wide, weighing in all 16 pounds, including handsomely finished oak cabinet. It indicates the strength of any piece of woven fabric from 1 to 60 pounds, which is as wide a range as would practically be required for woolen fabrics.

The price of the machine is $25, and it ought to have a wide sale among manufacturers, commission merchants, and buyers of woolen fabrics. S McKnight, 771 Broadway, New York, is the manufacturer, and invites correspondence.

—The art of designing will always be one of specialists—one making the graceful drawing, one the coloring, another adapting the whole to fit the loom and organization—thus producing a fabric which can be sold at the proper price, containing all the above skill.

Persian Fat-tailed Sheep.

In June, 1892, Truxton Beal, our United States Minister to Persia, brought on his return to the United States, 13 heads of Persian sheep and presented them to United States Commissioner of Agriculture, Secretary Rusk. As these sheep were said to require about the same care as Angora Goats, and as C. P. Bailey, of San Jose, Cal., was known to be the largest and most successful breeder of Angora goats, the secretary presented him with the whole lot with the request that he experiment with them, and if successful to report the results of his experiments occasionally to the Department.

The peculiarity about these sheep, as the name indicates, is the broad flat tail which hangs down about ten or twelve inches, and is from twelve to fifteen inches wide, weighing when the animal is fat from 20 to 30 pounds.

A baked sheep's tail is considered by the Persians a great delicacy, the choicest part of mutton. The substance is also frequently used by them as a substitute for butter.

The animals have proven very hardy and the dry climate of California seems well suited to them.

There is no doubt that they are one of the very best varieties of mutton sheep, and that they will always be considered a desirable addition to the live stock interests of our country. Though not as large as many of the English variety of mutton sheep (a grown ewe weighs about 140 and the bucks about 180 pounds), they mature much earlier and are frequently nearly full grown at six months old. A Persian lamb weighs about 10 to 12 pounds at birth and gains nearly a pound a day until he arrives at maturity.

A cross made by breeding an ordinary merino ewe to a Persian buck will give as large a lamb at three months old as the merino lamb is at six.

Some time since, Mr. Bailey presented a pair of Persian sheep to the University of California and they were placed on their experimental station at Paso Robles.

The San Francisco Chronicle of November 22, 1896, says: "Experiments in the breeding of a new kind of sheep at the University of California agricultural experimental stations in Paso Robles and Tulare are now being carried on, which give great promise of completely revolutionizing the mutton and wool industry on the Pacific Coast. This new variety of sheep is the result of the cross-breeding of the Persian and merino. Their wool and meat are above the quality of any yet produced in California. The first sample of wool, recently brought to San Francisco, sold at an advance of 4 cents per pound on the usual prices received. And as to the meat, it is hard, tender and marbeled to perfection.

—We think it may interest our readers to know the difference between a white and black frost. The late David M. Stone, the editor of the Journal of Commerce, described it as follows. Mr. Stone's opinions were considered almost infallible. He said—"Dew is deposited on calm clear nights but is not deposited in cloudy or windy weather. When the temperature is below 32 degrees on a night favorable to the formation of dew, the dew is frozen, and white hoar frost is produced. When the temperature falls to the same point on a night not favorable to the foundation of dew, the moisture within the plant may be frozen without any deposit of frost appearing on the outside; this is what is known as black frost. The formation of black frost does not require a temperature lower than that required for the formation of hoar frost although the state of the atmosphere makes the cold more severely felt.

—The members of the Loom Fixers' Association, Fall River, Mass., are contemplating the advisability of establishing a textile school of their own, where they can perfect themselves in their trade and make themselves competent to take care of all kinds of fancy looms. The object is a good one, and, no doubt, it can be carried out in a small, but efficient, way.

KNITTING DEPARTMENT.

The Knit Goods Situation.

Stagnation is the overshadowing characteristic of the knit goods market as 1897 is nearing an exit. Naturally, the close of the year is with rare exceptions, about the dullest of times. with plenty of price shaving, to get rid of odd lines before inventory. This year, however, to such conditions must be added four weeks of mushy weather and temperatures that have extracted all the sunshine from other articles of commerce, as well as cucumbers. Jobbers, of course, have felt this more than the retailers.

The crisp weather of early November, which came in jerks, brought an increasing demand with every upward movement of the mercury, showing that stocks in hand were infinitesimal. Therefore the temporary dullness has not brought as many concessions in figures as usually marks this period. The masterly inactivity that dominates the speculative boards, finds here fully as close a reflection as in any line of trade. The mills with a few exceptions have, on spring business, divided more equally the aggregate business than for many months, if not several seasons. Christmas trade, up to ten days before that holiday is generally reported as ahead of recent years, but this special trade does not affect knit goods enough, outside of a few superfine fancies, to cut an appreciable figure. There seems to be even fewer knit novelties this season than for three years past. Low priced spring stuff has the call and more's the pity. Still, this state of affairs will continue as long as such grades are made leaders to attract earlier orders.

To hastily review the last month, we note that the best fleeced goods have been scarce, such having had especially free outlet. The middle grades of cotton underwear were singularly neglected, upward movements timidly following advances in raw wool. In fact some manufacturers found the only way of keeping themselves whole was to reduce quality without altering quotations. Cotton yarns remained stiff, in spite of the weakness in cotton. Most of the better lines were cleanly sold up on winter goods, with not infrequent calls for exact duplicates.

Re-order business on spring product, has, during December, proved a great deal more conservative than the general expectation. While there is no positive promise of any easing of prices on low lines of cotton goods, some manufacturers express themselves as likely to be contented if they hold their own, with the downward movement of raw material.

Much depends on the yarn combination, if not everything. Talk concerning the fall of 1898 has begun and there are more than a few still harping on increased values in wool. Business is expected to show noticeable improvement within three weeks, as fewer firms are taking inventories January 1 than was formerly the case. There is no doubt that the rage for Roman striped waists has given new impetus to the fancy hosiery departments. It is safe to wager that next month will afford the writer of market reports better picking.

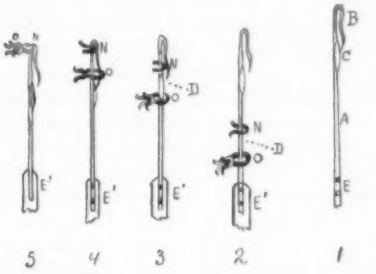
Hints on Practical Knitting.

J. H. QUILTER.

Frame work knitting was, as many may know, first introduced into England by a clergyman of the name of William Lee, he being at the time Vicar of the village of Calverton, about eleven miles from the now well-known hosiery town of Nottingham. His first machine was constructed with the bearded or spring needle, and though this was, in a sense, only a crude representation of the needle as used to-day, still it embodied all the essential principles necessary, and so truly did our first inventor understand

the requirement of mechanical knitting, that in his first needle he so constructed it that all the requirements were there in their correct form. Nothing that was not required was added, and everything that was required was included, viz., the three essential parts of every bearded or spring needle: the shank, the beard and the eye.

As this article is to include all principles of knitting upon this needle, it will be well to know the parts. In Fig. 1, a bearded spring needle is shown. "A" is the shank; "B," the beard; "C," the eye. These parts were on Wililam Lee's first needle and are on all needles made on this principle, to-day, wherever and under whatever circumstances they are used. Needles are made of better material, but still their main features remain unaltered. Each of these parts have a particular work to perform: "A," the shank, retains the last finished loop and is the



part upon which the new loop is formed; "B," the beard, is for the purpose of keeping on the needle the new loop, but is of such a character that it can be closed, and so, while holding the new loop, the old loop can pass over it and lie hanging upon the new loop. As the old loop travels along the shank "A," there must be no impediment whatever. For this purpose it is necessary that the point of the beard should be clear away from the loop. It is for the purpose of securing the point of the beard and keeping it in position, that the eye, "C," is introduced.

Every practical knitter well knows that not one of these parts can be dispensed with, and that each must perform its part correctly, if the knitting is to be perfect.

To form the loop on the needles on the hand frame or Mellor's rotary frame, sinkers are used which form the loop and move it along the needle. Sinkers and needles work in conjunction with each other in two different ways. First, needles may be stationary and the loops formed on the shank moved to their various positions by the sinkers, or second, the loops may be formed and remain stationary; but the needle, receding by a special backward movement, brings the needle to a position so that the loop has the same position in relation to the sinker. It is these various positions that each knitter must understand. These are shown by Figs. 2, 3, 4 and 5.

Fig. 2 shows the new loop, "N," and the old loop, "O," in their respective places at the first formation of the new loop, the two being on the shank of the needle away from the beard. The point to be here considered is the relative distance of one from the other. This is regulated by the nose of the sinker which, at the point "D," stands between them and so keeps them in position.

The next important point is that shown in Fig. 3, where they are still at the same distance apart, the nose of the sinker having remained between them during their travel to this point.

It will now be seen that "N" has passed under the beard of the needle, while "O" remains behind it. This is one of the most important of all positions, as two great difficulties here occur if such positions are not correct. The first is in regard to the new loop, "N," the second as regards the old one, "O." If "N" does not ride sufficiently far, it will stand beyond the needle beard, and if the loops travel too far, loop "O" may, along with loop "N," pass under the beard.

Now, if we study the next position, Fig. 4, where "N" still remains under the beard, while "O" is lying on top of the beard, it will be seen that witht one or the other of the positions before mentioned, this result could not possibly be obtained.

Why? This is easily seen. Should

"N" not have reached the beard, it would, with "O," pass on to it, both being on the top of the needle beard.

Fig. 4's position being obtained, Fig. 5's position must naturally follow, viz., the passing of "O" off the needle, and hanging on "N," as shown. Whereas under the fault mentioned, either "N" and "O" would both pass over the needle beard and leave the needle empty of a loop, or both "N" and "O" would pass under the beard and leave the needle with two loops instead of one, as shown.

This is applicable to an individual loop as well as to the whole set of loops across any divsion or number of divisions, and it is proposed, in the series of articles, to show the various ways or mechanical means that are in vogue in the various knitting frames using this class of needle, in order that the correct positions may be obtained, and to show the defects that may occur through any particular movement being incorrect or not made at its proper time.

What is known as the timing of a machine is an important item, for though we may divide the making of any row of loops into a given number of motions, each of those work together or so closely following each other that, unless they are closely followed, they may be unseparable, and apparent as one continuous motion. These motions may be divided as follows: first, laying of thread; second, forming of the loops over the needle; third, bringing them to a position as shown at Fig. 3; fourth, leaving them independently in this position; fifth, closing the new loop under the beard; sixth, passing the old loop, "O," on to the top of the beard; seventh, passing the old loop "O" off the needle and on to the new loop "N;" eight, taking the old loop "O" from the position, as at Fig. 5, to its original positfon at the commencing as shown at Fig. 2.

(To be continued.)

—The extensive range of cloths produced in woolen and worsted yarns is not so much due to the use of the new or different makes, as to the distinct systems of setting and methods of manufacture.

The Setting Up and Care of Knitting Machinery.

THE LEIGHTON FLAT-HEAD RIBBED KNITTING MACHINERY FOR UNDERWEAR, CARDIGAN JACKETS, SWEATERS, ETC.

The readers of the Textile World will doubtless remember the interesting series of articles, under the above head, which appeared during 1895, and which described at length the setting up and care of various types of knitting machinery: the seamless knitter; the circular spring needle machine; the circular spring machine with trick needles; the circular spring machine with leaded needles; and many points connected with fixing and operating such machinery. The above types of circular machines together with the flat knitting machinery, embrace the broad classifications into which American built knitting machinery is grouped, with the exception of the Leighton machine, which is a distinctive type, and it is this class of machinery which is described in this article:

These machines are a type, in which the needle plate or dial is located outside of the cylinder, the horizontal or plate needles forming the outside stitches, while the cylinder forms the inside stitches of the fabric, which is just the reverse of the cylinder and dial type of machine; therefore the treatment of the machine will be somewhat different in adjusting stitches, etc.

We will consider first the underwear style of machine, which is made in 4, 6 and 8 feeds. In setting up the machine when it is received from the manufacturer, set the machine on the floor about where it is to be belted. In fitting up a knitting room, it is well to set the machines in two rows under the driving shaft with room enough between the rows for the operator and fixer to walk; machines in one row all facing in one direction and those in the other row facing the opposite way, then all the machines can be operated from the centre aisle.

When the machine is located where it is to be run, see that it stands level,

before fastening to the floor. The driving shaft should have such a speed as will allow the driving pulley to be about 10 inches in diameter to save unnecessary strain on the belts, and wearing the shaft bearings. Mount the bobbin stand on the spindle of the machine, adjusting it into proper position to connect the brass chain of the load up stop motion with the stop dog on the bobbin stand, fastening the set screws tight on the spindle; now wipe the oil off from all the bright surfaces, using a little spirits of turpentine if necessary, see that none of the needles have been partly out of their grooves. Also see that the yarn guides are set right to deliver yarn into the hooks of the needles, and also that the latch openers are set to go through the hooks of the needles correctly.

The yarn may now be put on, the machine being turned a few times to see that each yarn guide is correctly set. Adjust the weight on the take up so that the web is taut when touched with the hand, the weight being put out farther on the arm for the heavy yarns, and for very light yarns the weight may be removed entirely, and sometimes with the lightest yarns, it may be necessary to hang a light weight on the small hook at the front of the take up; as the machines are all knit at the factory and the web left on the needles, it is only necessary to put on a spool of yarn for each feed and start it up. When a short piece of goods has been knit, you can see it plainly on the outside of the cylinder and judge if the stitches are all of the same length, if not, you can mark the yarns and see which carriers use it up the fastest; as the draw cams which form the stitches are all set with a screw they can be adjusted very easily; the cylinder needles should draw sufficient to cast their stitches easily.

In this flat head type of machines, the horizontal or plate needles regulate the amount of yarn taken in the stitches, and it is very seldom necessary to raise or lower the cylinder, as the only object in doing so is to allow sufficient throat for the web to pass freely from the needles. When the web has the right stitch, see that the garment measuring chain is made up correctly to give you the length of garment required. After the machines have been running for sometime, if there is any indication of breaking the shanks off the needles, it would be well at the first oportunity to take the draw or knock off cams out of the machine and see that they are smooth and free from any nicks or marks, as a stitch in time will sometimes save a good deal of work for a fixer on knitting machinery.

The cams on the cam plate or horizontal needles can be examined by taking out the two screws which fasten the segments to the camplate; the segment can then be slipped to the left, by turning the machine by the hand a short distance, holding the segment still; in putting the segment back drop it over the needles in the proper place and slide it to the right until the screw holes come in line. The knock off cam in the cylinder can be removed by taking out the large-headed screw which acts as a stop to that cam when knitting the tuck stitch. The cam can then be pulled out and replaced the same way. By pulling the knurled pin, the ring can be moved to any position by hand. If after putting the machine together again, any drop stitches should appear in the web, it will be well to look at the setting of the cylinder cam plug.

There are several ways in which the machine may be out of adjustment and cause imperfect work. If the stitches are dropping on the inside of the fabric, the cylinder cam plug may be set too far forward, the cylinder needle latches may fly closed just as they rise through the stitch. The yarn keeps these latches open if the cam plug is not too far ahead; if the cam plug is set too far back, the yarn will be laid behind the cylinder needle latches and close them up.

Dropping stitches from the plate needles or the outside of the web is generally owing to the yarn carrier being too high from the needles, thus allowing the yarn to slip over the hooks of the needles; if not from this cause, the latches may be flying shut, as they pass through the stitch, the yarn carier should guard them at this

point and keep them open. Again the stitch may lift off the hook if the stitch steels are too far back of the yarn carrier should guard them at this forward after drawing a full length of stitch; the steel on which the hook rests should move from under that needle by the time the hook reaches the edge of the steel, otherwise the steel may lift the stitch off the hook. When the cylinder plug and plate needle are matched correctly, the cylinder needle will be drawing its stitch as the plate needle is coming forward over the steel.

If the geared ring carrying the studs should get misplaced in taking a machine apart, it can be set into proper position by loosening the buttons on the outside of the cam plate, then lifting this plate out of mesh with the driving gear; turn the shaft back or forward sufficient to set the steels in their correct position.

When the stitch cams or knock off cams are ground, or a new one put into the machine, see that the first corner is rounded a little and the balance is sloped off after leaving the end wide enough to hold two needles at full length of the stitch; if more than two needles are held back they may break holes in the web.

If a small hole shows in the web, examine it for knots; if the ends of the yarn look as if cut off, having square ends, it was most likely cut by the latch of the needle at that place, shutting onto the thread, if the ends of the yarn are fine and tapered, the cause would naturally be a twit, or thin spot in the yarn; if the ends of the yarn are long and look untwisted, the chances are that the cylinder needle draws its stitch ahead of the let up of the plate needle and the cam plug should be let back a trifle, which is done by the adjusting screw in the button which connects the plug and yoke of the machine.

Large holes in the work are usually caused by a poor needle, having a crooked hook or latch; a rough stitch along one of the ribs in the web, often indicates a loose rivet and as every such mark can be easily traced to its needle, by following the rib up to the needle on the outside of the cylinder, such needles should be removed at once.

The flyings of the yarn should be blown out of the machine occasionally with a piece of pasteboard or other suitable fan.

In adjusting the thread stop motions, have them as light as possible and still not fall when the yarn is run through the guides.

In case of a quarter running off of the needles, push the edge of the webbing up between the needles and hook it over the plate needles just forward of the yarn carriers, or if the web is thin the needles will push through it by simply lifting the web in front of the needles. The extra wide throat of the machine at these places ahead of the yarn carrier enables one to do this very easily. Broken needles can be taken out of the cylinder or plate any time without removing keys or slides.

In making faced goods, i. e. one face of the fabric wool and the other or back of cotton, it is necessary only to thread the wool into alternate carriers and the cotton in the others.

In knitting plated goods, i. e. wool or silk surfaces and the centre or interior of the fabric of cotton, the wool threads should run through the quirl guides nearest the centre of the machine near the carrier and the cotton in the quirls next to the outside of the machine. This plating can be done on the outside or inside surface of all tucked goods, by threading alternate carriers with all cotton, according to the side you wish the wool to show. Threading the wool and cotton into all the carriers as above described to plate, will give both surfaces plated, either plain rib or tucked stitch.

The Leighton underwear sleeve and cuff machine being shipped from the factory all ready to run except putting the bobbin stand in place, we suppose that the machine is ready to knit. It should be noted first of all where the pattern ring on top of the machine is set, as compared to the position of the chain which regulates the length of the sleeve and the changes in it. This is necessary that the machine may be properly timed to knit the welt correctly.

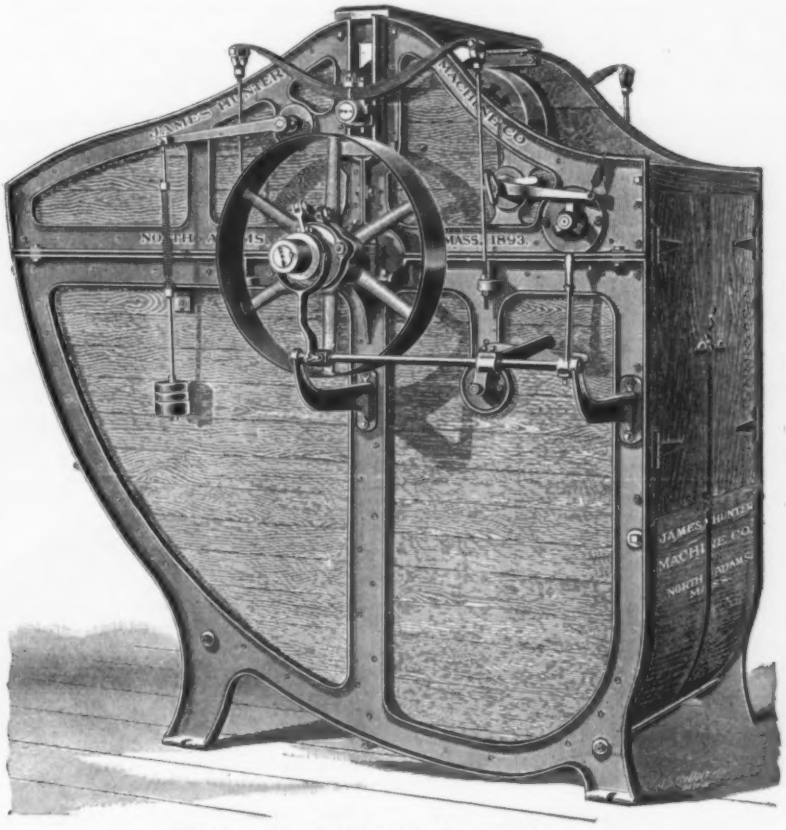
If the web runs off from a sleeve

machine the best way to set it again is to operate the pattern ring by hand to put the cylinder needles into the welt, then put the web up in front of the yarn carrier and as the needles push out through the web the first few turns of the machine, the stitches will all be on one set of needles. After it is started this way, then shift the ring to knit plain rib or tuck stitch and turn the chain wheel to match the pattern ring's position and it will start off all right. Connected with the knock off cams on the plate needles there is a double lever which comes in contact with the inside of the pattern ring and are adjusted to automatically tighten or loosen the stitch while knitting the welt, cuff or sleeve.

In many respects the previous remarks on the Leighton machine will apply to the cardigan jacket and sweater machine of this make, but in the racking machines it is necessary to be careful in starting these machines, after a quarter runs off, to see that the racking or shogging chains are in proper position to start a new garment.

The Hunter Combination Fuller and Washer for Knit Goods in the String.

Every woolen manufacturer is familiar with the wet finishing machinery built by the James Hunter Machine Co., North Adams, Mass., and the attention of knit goods manufacturers is directed to their machine for



FULLER AND WASHER FOR KNIT GOODS.

fulling and washing knit goods in the string, an illustration of which is presented herewith.

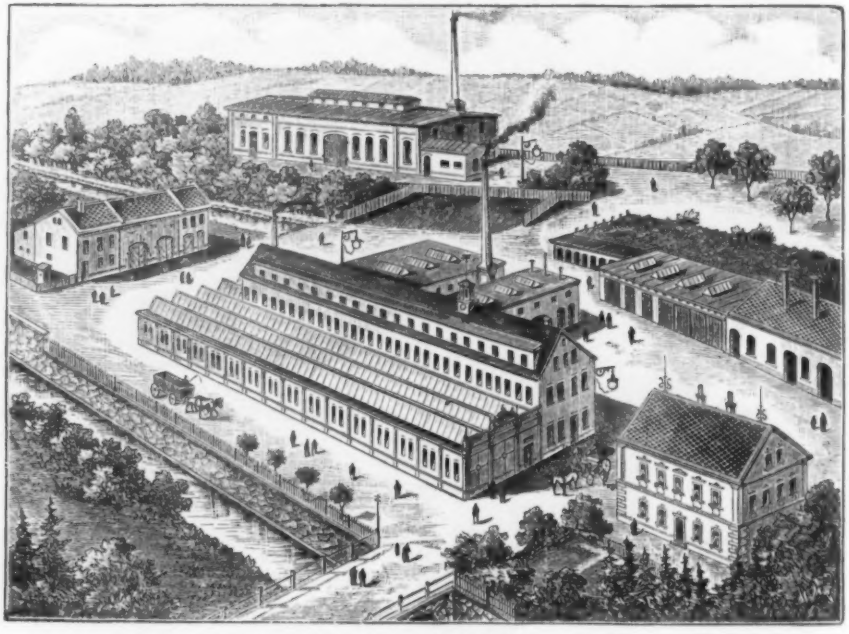
This machine is designed, as its name implies, to perform the two distinct operations of fulling and washing. It is constructed on the same lines as their standard fulling mill, but in addition, has special attachments which render it capable of being transferred into a most efficient washer. The goods are put into the machine in the same manner as any

rotary machine, and are first fulled. When the fulling operation has been carried to the desired point, the washer attachments are brought into play, and the goods thoroughly washed. These two operations are performed at one handling of the goods, and in a very superior and expeditious manner. The shape of the machine is such that the goods have a free, easy motion, always lifting from the top folds. This prevents knotting up, undue strain on the goods, and assures economy of power.

Grosser Knitting Machine Works.

BRUSHING AND FLEECING MACHINE.

We illustrate herewith, the Grosser Knitting Machine Works, of Germany, whose products in this country are represented by Arthur Mueller, 754-760 Lexington Ave., Brooklyn, N. Y. Their principal specialty is the Grosser patent knitting machine, on the Lamb principle, for golf hose, sweaters, jackets, ladies' skirts, golf waists, gloves, mittens, etc, in fancy patterns,

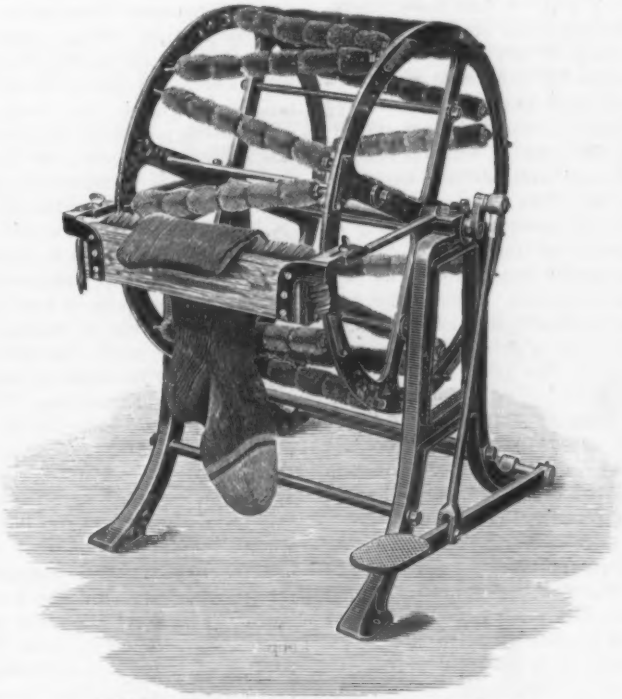


THE GROSSER KNITTING MACHINE WORKS.

In point of construction, there is nothing further to be desired in the way of thoroughness and convenient arangement. The frame is of cast iron, the casing of Georgia pine, the interior fixtures are of hard wood and bronze. The machine is built with soap box, valves, gates, water inlet, packing boxes, and stop motion, making it complete in all details. It is entitled to the serious consideration of progressive knit goods manufacturers, and the company invites correspondence concerning it.

to run either by hand or by power. We illustrated and described this machine in our issue of May, 1897. If run by power, it is made in one up to eight sections, so arranged that each section works independently of the others, and can be of a different needle gauge, but all must be of the same width of needle bed. The sections are constructed so as to work entirely automatic, no hand work being required from the person tending, and, on account of this, one girl is fully able to care for the entire machine. The

reason why many knit goods manufacturers hesitate about putting in flat knitting machines is the fact that they only have had a comparatively small production. To remedy this inconvenience, and to make the machines more suitable for the American market, in the saving of labor and cheapening the cost of production, recent improvements have been made which, it is thought, will satisfactorily meet these objections. The small cut shows the Grosser 6-section full-automatic sweater machine, made on the same principle as described before.

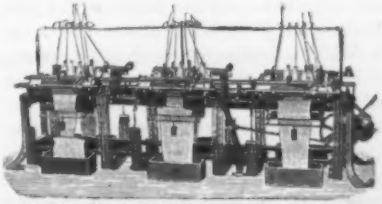


GROSSER BRUSHING AND FLEECING MACHINE.

We also illustrate a new brushing, or fleecing machine, built by the Grosser Knitting Machine Works. This machine is made in three different widths, 10, 15, and 20 inches, to be sold at $38, $50, and $60 respectively. The machine is intended for fleecing gloves, mittens, hosiery, underwear, sweaters, cardigan jackets, etc.

Mr. Mueller keeps a full stock of all needles and supplies, and is now enabled to make the jacquard cards which produce the pattern at his place of business. He is thus able to supply his customers with new sets of cards at short notice.

Mr. Mueller has recently been appointed sole United States agent for the line of full fashioned hosiery and underwear, spring needle knitting machinery and auxiliary machines of F. Anton Ludwig and Sons, of Chemitz, Saxony (of the improved Cotton's Patent).



6-SECTION AUTOMATIC MACHINE.

—The great flocks that once were herded on the plains of the West are not there to-day.

Combined Woolen and Linen Underclothing.

One of the most important conditions for the health of man is the keeping open of the pores of the skin. It is therfore of extreme importance that clothing, and especially underclothing, should be manufactured in such a manner that the skin will always be kept as cool, clean, and dry as possible. When woolen underclothing is worn, the natural texture of the wool causes it to become fluffy or produce fluff or fine loose fibers, which clog the pores of the skin. The consequences of this are well known.

With regard to these well recognized facts, a German has recently invented a combined woolen and linen undergarment, the object of which is to keep the skin cool and obviate excessive perspiration. It is made of a material that does not possess the property or disadvantage of forming or causing fluff, and which finally keeps the skin dry—that is to say, absorbs the perspiration produced, in such a manner that the layers of fabric in immediate contact with the body shall remain dry.

It has been discovered by numerous practical experiments that wool and cotton have the property of absorbing moisture, but that wool deprived of oil has this property in a considerably greater degree; but in order to prevent the clogging of the pores of the skin by the fluff, the fabric of which the garment is made is woven or knit with that surface which comes in direct contact with the skin, of linen or flax fibre, the linen and wool being preferably prepared as follows: The linen threads, which come in contact with the skin and are possessed of but little power of absorption, are well dried at a temperature of 212 degrees, then steeped in a solution of ten parts of paraffin and one hundred parts of benzene, afterward being allowed to lie for from four to five hours at a medium temperature. They are then taken out and allowed to drip and are then completely dried at 212 degrees. The yarn so obtained does not absorb any damp—that is to say, any perspiration. The wool is allowed to lie in a bath warmed to a temperature of 104 degrees and consisting of a well-mixed solution of one hundred liters of water, six liters of spirits sal-ammoniac, one and three-fourth pounds of soap, and two pounds of soda, during a period of four hours. It is then well stretched, rinsed in clear running water, and dried at 212 degrees. The wool, still warm, is now placed in a bath heated to 104 degrees, and composed of five parts of spirits of sal-ammonia and three parts of benzene. Each skein is then stretched under strong pressure for three minutes and again rinsed in running water and dried. While by the process described the linen threads have their power of absorption reduced eighty per cent., the like power in the wool is increased in a similar degree by the last-mentioned process. The threads are then woven or knit by any suitable means to form a fabric having one side composed entirely of linen threads or yarn and the other side entirely of woolen threads or yarn, after which the fabric, if in the piece, may be made up into underclothing of any pattern. The linen surface, which comes in direct contact with the skin, remains quite dry, taking up no moisture, while the moisture—that is to say, the perspiration—is absorbed by the outer lying woolen surface. The wool operates exactly like a wick, absorbing the moisture and keeping the body quite warm. The wool does not interfere with evaporation any more than the cotton, and has the advantage that, the soft agreeable linen surface remaining in contact with the body, no sticking of the underclothing to the skin is possible.

—No child under thirteen years of age shall be employed at any time in any factory. [Mass. law.

—The famous Boadicea, Queen of the Iceni, whose realm included the area around London, in the last of her encounters with the Roman forces, was stated to have been dressed in a checked costume of white and blue.

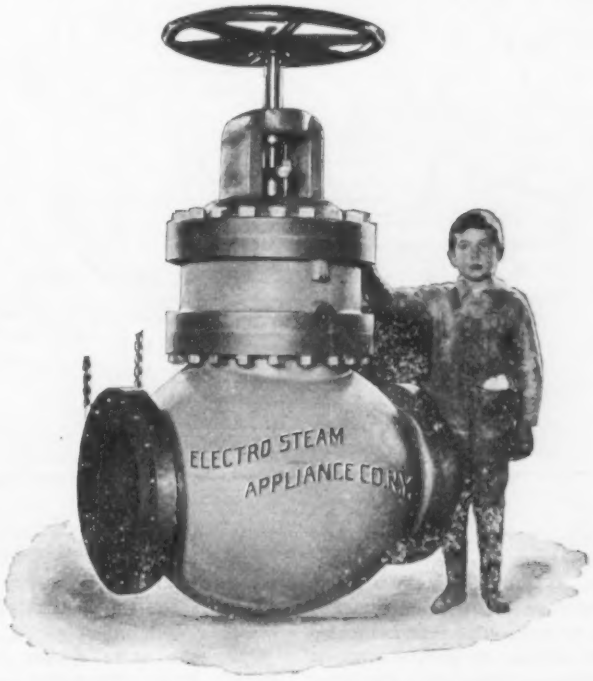
POWER DEPARTMENT

O. R. YOUNG, M. E., Editor.

An Emergency Valve.

FOR PROTECTION OF LIFE AND PROPERTY IN STEAM POWER PLANTS.—THE BROWN COMBINED SCREW AND EMERGENCY THROTTLE AND BOILER VALVE.

From the early days of steam engineering it has been apparent that a very quick closing valve which could be controlled from a distance would prevent a large part of the accidents to which steam machinery is subject.



In modern practice which demands the use of very high pressures and high speeds in steam and electric power plants, such a valve becomes more and more a necessity.

In case of the bursting of a large steam pipe (either in stationary or marine practice), it is usually impossible to get at the boiler valve to shut off steam until the boilers have emptied themselves through the fractured pipe, which of course makes it impossible to render any assistance to those who may have been overcome by the escaping steam or prevent the damage usually attending such accidents.

Another very serious type of accident which has become common, of late, is the bursting of the fly-wheels of large engines, due to increase of speed, which may have been caused by some very slight disorder of the governing gear, or other cause, and which accidents are often as destructive to life and property as the bursting of boilers.

The valve herein described, with its attendant auxiliary means of control,

is the invention of G. W. Brown, and was designed to fill the great and widespread demand for a practical, reliable emergency protection against the accidents referred to. It consists of a simple disc screw valve, to which has been added an emergency piston which operates entirely independent of the screw and in no way interferes with its action, and which can be controlled from a distance by automatic or manual means, to cause it to close itself by steam pressure instantly.

On the common form of valve body is bolted to cylinder, A; upon this cylinder is bolted the usual bonnet or cover which carries the screw and hand wheel (Fig. 1). In the cylinder is a piston, C, provided with a loose-fitting ring, H, around which steam is permitted to leak. The trunk, F, also loosely fits a ring, G, and the screw stem, S, presses against the valve stem but is not fastened to it, covering or closing the passage, L, when the main valve is open, also when closed by the hand wheel, as in Figs. 1 and 2.

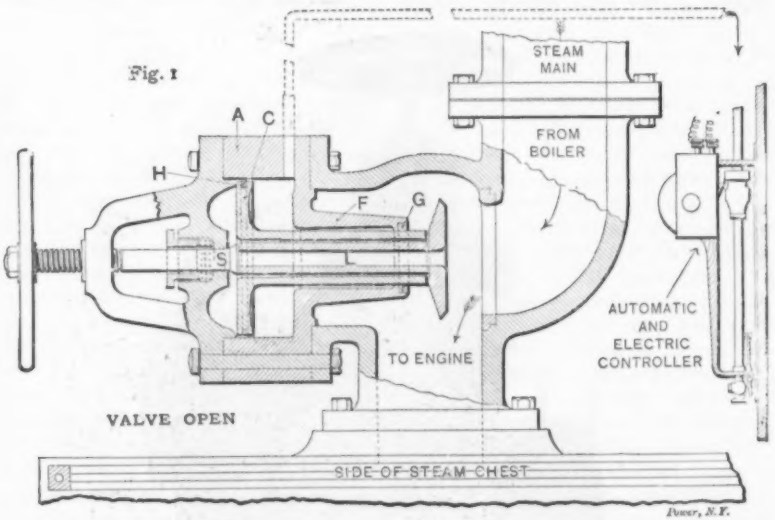
When closing the valve by the hand wheel, the spaces M and N being filled with steam, the valve simply acts as a screw valve, the pressure on the underside of the valve disc keeping the valve stem forced against the end of the screw, S.

To close the valve instantly, as in Fig. 3, it is only necessary to open the vent or relief pipe, E, by automatic or manual means, which takes the pressure off the underside of the piston, allowing the pressure on the top side of the same to force the valve to its seat.

The piston having a much larger area than the valve, it has a large surplus of power to overcome any resistance of steam pressure against it.

As long as the screw remains out, the steam passing through the hollow stem, L, maintains boiler pressure on the top of the piston and holds the valve shut; but it can be opened instantly by closing the vent, or relief pipe, and turning the screw in to close the passage, L, then turning screw back.

Fig. 1



The vent, or relief pipe, is a small iron or brass pipe which may be extended to any part of the engine or boiler room, or outside of the same if desirable, and be provided with small screw or lever valves at convenient points, the opening of any one of which, by hand or other means, will cause the main valve to close by the emergency piston.

The same principle is applied to the gate type of valve, as well as to the globe and angle types herein de-

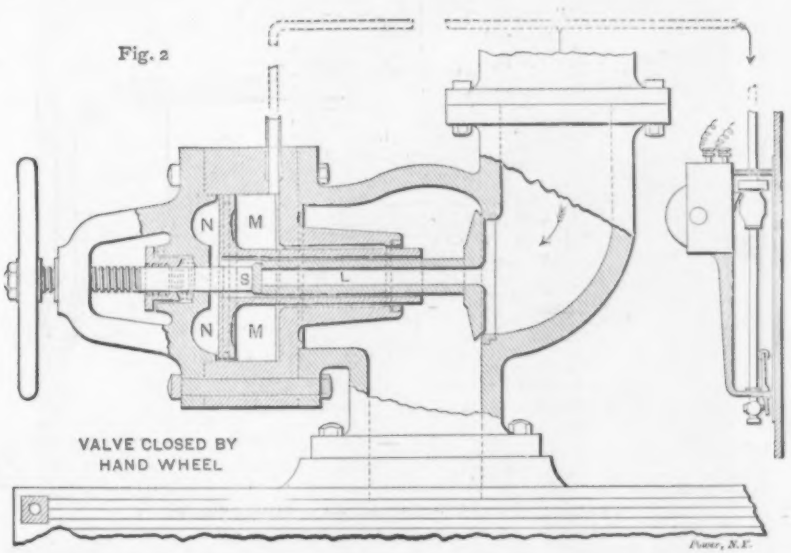
scribed, but through somewhat different methods.

To guard the engine automatically against running away, the consequent bursting of the fly-wheel, etc., the relief pipe is extended to a controller, which is provided with a small lever valve at the end of the relief pipe connection, a tiny weight sliding upon the same and which in falling opens such relief valve, a small governor (driven by a small band connection with the engine shaft) controlling the weight. This governor is adjusted to drop the weight, to open the relief valve and cause the throttle valve to close, when the overspeed of the engine reaches the danger point determined upon, and once adjusted, requires no further attention. The bearings of the governor run on fibre graphite and require no oiling.

To give control of the engine from a distance and guard against accident to operatives and machinery in mills and factories, the different floors or rooms are provided with electric push buttons connected with an electric device operating through an electro-magnet in the controller. A pressing of any of these buttons operates the controller, causing the engine to stop, the same as in the automatic action. These push-buttons are of peculiar design, enclosed in small iron boxes and so arranged that they cannot be reached without ringing a small alarm bell, which prevents tampering by the inquisitive. This alarm bell also furnishes a means of testing the electric circuit without closing the valve.

When used as a boiler valve in stationary or marine practice, the small relief pipe runs the length of the steam main and enters it at or near the throttle valve. Should the main steam pipe burst, the fall of pressure in the relief pipe would cause the valve or valves with which it is connected to close. It is also operated electrically and manually from a distance.

Fig. 2



The Electro-Steam Appliance Co., 320 Broadway, N. Y., control the manufacture and sale of this apparatus and own the patents covering the same.

—The larger part of the printed goods are plain woven fabrics as is also the case in ginghams, although in the latter, colored threads are introduced to form the design, and an examination of ginghams will show that almost without exception the colors are either in parallel lines, or at right angles to one another.

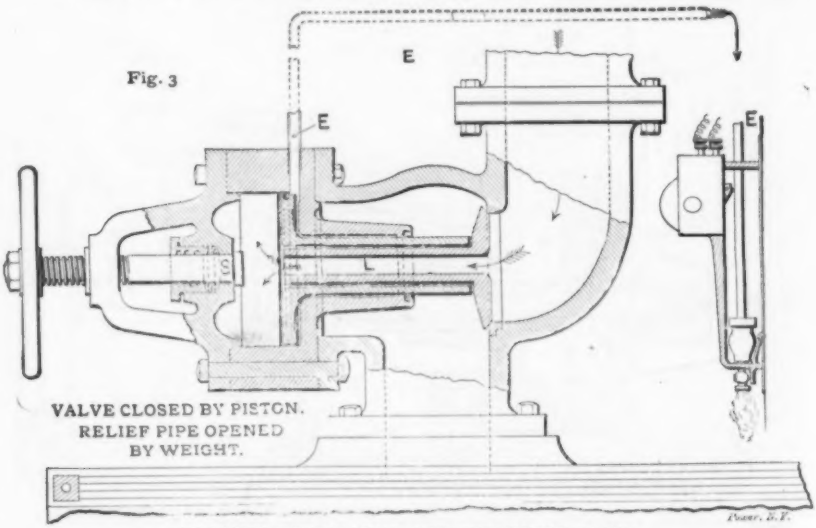
Wrought Steel Penstocks

We illustrate, herewith, a steel penstock recently installed by George Dalrymple, Fair Haven, Vermont, for the Lake George Paper Company Works, Ticonderoga, N. Y. This penstock is ten feet in diameter, and 642 feet long. Mr. Dalrymple has installed a number of notable penstocks during the past summer. Among them may be mentioned: one at the Hardwick Electric Station, Hardwick, Vt. (325 feet long and 66 inches in diameter); one for the Missisquoi Pulp Co., Sheldon Springs, Vt. (12 feet in diameter, and 160 feet long); and one now nearly completed at Fitchburg, Mass. (34 inches in diameter and 7,200 feet long). A thirty-inch penstock, 1,400 feet long, will soon be in place for P. W. Turner & Co., Turnerville, Ct. Mr. Dalrymple's works have been so rushed with orders during the past summer that they have had to run over time, and even then, orders had to be refused.

These penstocks are practically indestructable, and absolutely water tight. They can be used anywhere instead of expensive canals, to conduct water from dams to water-wheels; in fact are in all ordinary cases far preferable, and, at the same time, much cheaper than canals. These penstocks can be made of any desired size, and to sustain any head of water up to 200 feet. They are constructed to meet the requirements of the place where they are to be used, because they are constructed on the ground where they are to be used, and are therefore designed and built to meet the special requirments of that place, so that there can be no mis-fits and consequent delays when the work is ready to put together. The steel plates are shipped direct from the rolling mills to the factory, where they are punched, rolled, and wrought into the desired form with portable machinery especially designed for this work.

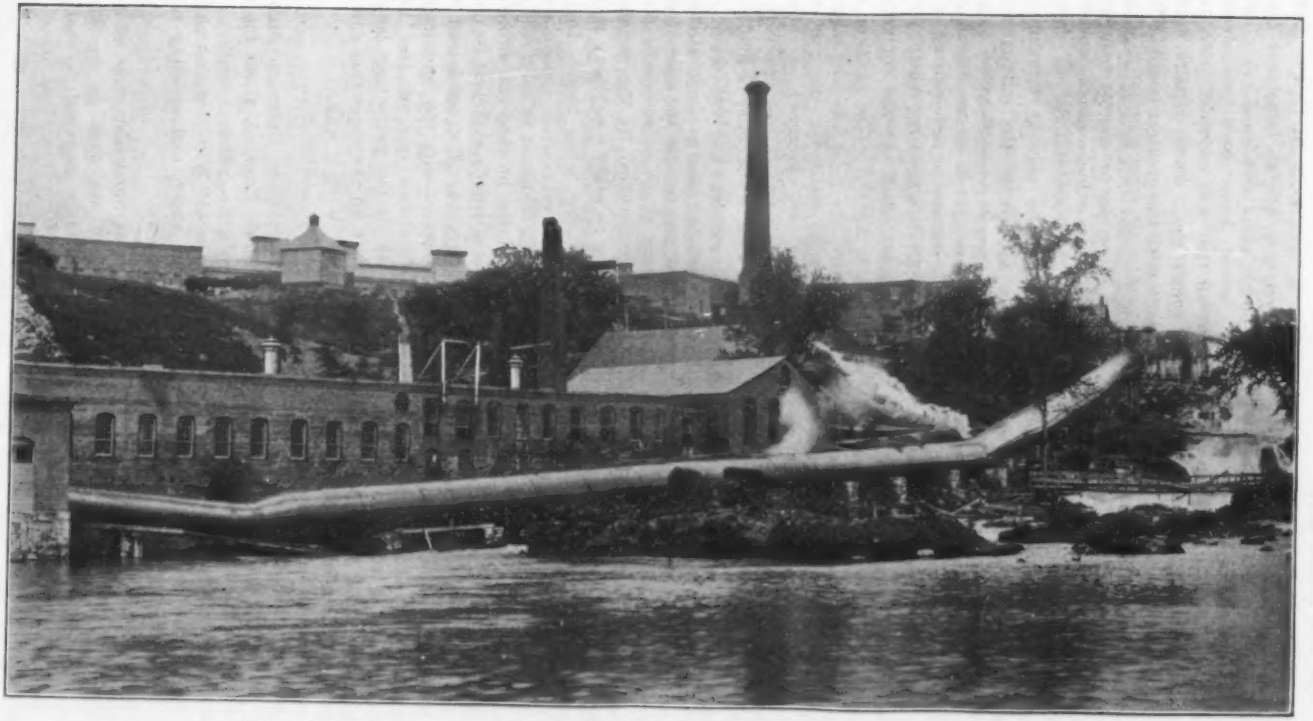
The following parties are using penstocks constructed by Mr. Dalrymple within the last few years: High Falls Pulp Co., Canton, N. Y.; Ellis Converse & Co., Strafford Springs; Rodney Hunt Machine Co., Orange, Mass; Arnold Print Works, No. Adams, Mass.; and Burlington Woolen Co., Winooski, Vt.

Fig. 3



AN EMERGENCY VALVE—SEE PRECEDING PAGES.

—It is specially noteworthy that although the Angora has been brought to many parts of Australia, and by some most enterprising men, too, yet the production of mohair did not pass an experimental stage.



WROUGHT STEEL PENSTOCK—MADE BY GEORGE DALRYMPLE, FAIR HAVEN, VERMONT.

The Mill Repair Shop.

Two papers were presented at the recent meeting of the New England Cotton Manufacturers' Association on this subject by F. M. Messenger, North Grosvenordale, Conn., and by D. D. Donovan, Providence, R. I.

Mr. Messenger said:

A well managed repair shop is a paying institution, and the new parts required for repairs may largely be finished at the mills at a profit. Every cotton manufactory of any considerable size, should have connected with it a first-class shop. It should be handled as an entirely separate business, charging a reasonable sum for its power, office, superintending, rent, taxes, insurance, etc. All raw materials should be charged against the shop as well as its labor. Finished work is placed in stock for delivery, as needed, to the several departments, the shop receiving credit at market prices. All repair work such as mending broken, or applying new parts, or any work of a nature that produces nothing, should be charged to the several departments where it belongs, at the rate of man's time, plus a certain percentage sufficient to cover the rent and other charges against the shop, including use of tools, etc., and bills rendered weekly against the several departments. A well appointed repair shop should consist of a machine and blacksmith shop, a wood working or carpenter shop, and if tenement work is to be done, a tin shop will pay. Each shop should be equipped with all necessary machines of the best. The selection and care of proper tools is a matter of great importance. Any shop employing half a dozen hands should have its tool room, and it should be under the care of one man; he can have a lathe inside, and be kept busy on light work. A checking system should be used, and any tool absent should have in its place a check denoting who has it; this avoids losses and locates the responsibility for breakages. Without some system of this kind the cost of tools is likely to be very large.

Mr. Donovan said:

The engine lathe, the planer and the drill press, find places in all repair shops. If these tools are kept in good condition they are an important factor in any shop, and some years ago they would have been considered about all that was required. For the mill repair shop, where repairs must be made with the greatest possible despatch, the universal milling machine will be found an invaluable help; its adaptability to a large range of work makes it indispensable in an up-to-date shop. The vertical attachment recently applied to the milling machine has greatly increased its scope and efficiency at a slight additional cost. The automatic gear cutting machine is another tool to which your attention is called. As the replacing of gears is an important element in mill repairs, the most efficient means should be at hand for the purpose when they are required. A stock room, where parts of machinery that are liable to give out could be made up and kept on hand for use when required, would greatly facilitate the making of repairs, for the cost of the part is very slight as compared with the loss occassioned by the stoppage of the loom or other machinery while the repairs are being made. Drills, reamers and measuring instruments can now be purchased at such reasonable figures that no shop can afford to be without a supply sufficient to meet all requirements. For quick and accurate measurements the micrometer caliper furnishes one of the best means. By its use parts may be duplicated with an exactness that can be obtained in no other way.

—The Hampshire Down originated in Hampshire, England, about the beginning of the present century by blending the old Wiltshire and native Hampshire sheep and crossing with the Southdown.

—The most important class of dyestuffs which are dyed on to cotton with a metallic mordant is that to which the term "mordant dyes" is now given. This includes such dyes as logwood, fustic, madder, alizarine, and all the dyes derived from anthracene.

COLORS AND DYEING.

Dye Recipes for January.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16 page pamphlet, in convenient form for preservation. Subscription price for the TEXTILE WORLD with the Dyers' Supplement is $3.

RECIPE NO. 1.

Light Blue on Worsted Yarn.

Eriocyanine on 100 lbs. worsted yarn.

Prepare dye bath with

4 oz. Eriocyanine.
(John J. Keller & Co., 104 Murray St., New York.)
2 lbs. Sulphuric Acid.
15 lbs. Glauber's Salt.

Enter in yarn at 160° F. Bring temperature to a boil, and turn to shade at that heat.

Eriocyanine produces a somewhat redder shade of blue than Erioglaucine, otherwise the working results are the same, and can be used in combination shades just as well. For dyeing level and dark blues, this dye is well adapted, on account of its going slowly on to the fibre. (See recipe No. 5, this issue.)

RECIPE NO. 2.

Dark Blue on Worsted Yarn.

Logwood Extract N on 100 pounds worsted yarn.

Prepare dye bath with

4 lbs. Logwood Extract N.
(Stamford Mfg. Co., 133 Front St., New York.)
2 lbs. Oxalic Acid.
2 lbs. Copperas.
1 lb. Blue Vitriol.
½ lb. Acid Violet 6 B.

Enter in yarn at 160° F., bring to boil while turning, and turn 1 1-2 hours at that heat.

The above method is a quick and easy one, as well as a cheap way of dyeing a blue that is fast and will not rub off. The blue can be made darker or lighter by varying the amount of the extract. This logwood, being a pure and concentrated extract, is well adapted for blues, and produces on a chrome mordant an extra fine black. (See 1897 recipes 60, 71, 100, 124, 134 and 180, for this extract used alone and in combination.)

RECIPE NO. 3.

Black on Mixed Flannel.

Union Black B on 100 lbs. of mixed cotton and wool flannels.

Prepare dye bath with

5 lbs. Union Black B.
(New York & Boston Dyewood Co., 55 Beekman St., New York.)
25 lbs. Glauber's Salt.

Enter in cloth at boil, and turn one hour at that heat. Shut off steam and run one-half hour longer. Rinse.

Union Black B, like Union Blue R, shown in recipe 176, Nov., 1897, will produce an even shade on mixed goods, and dye both cotton and wool an equal depth of color in one bath.

RECIPE NO. 4.

Navy Blue on Woolen Yarn.

Marine Blue and Acid Wool Black on 100 lbs. coarse wool and shoddy yarn.

Prepare dye bath with

2¼ lbs. Marine Blue.
¾ lb. Acid Wool Black.
(Stone & Ware Co., 157 Maiden Lane, New York.)
10 lbs. Glauber's Salt.
5 lbs. Oil of Vitriol.

Enter in yarn at 130° F., bring temperature up to boil while turning, and turn to shade at that heat.

The above color is dyed at a very cheap price. As both colors are acid dyes, they work well together. The blue dyes a fine shade in itself, and will hold up a good percentage of black for dark shades. The color is

perfectly fast, does not rub, dyes evenly, quickly and cheaply. (See recipe 166, Nov., 1897, for a navy blue from Marine Blue.)

RECIPE No. 5.

Medium Blue on Worsted Yarn.

Erioglaucine on 100 lbs. worsted yarn.

Prepare dye bath with

3 lbs. Erioglaucine.
(John J. Keller & Co., 104 Murray St., New York.)
3 lbs. Sulphuric Acid.
20 lbs. Glauber's Salt.

Enter in yarn at 140° F.; bring to boil while turning, and turn to shade at that heat.

Erioglaucine is a very soluble powder, and for dark shades of blue it retains its brightness and richness. It is fast and can be used to advantage in combination with yellow, orange, red, etc., for various shades. It will penetrate the thickest fibre. (See 1897 recipe No. 173 for a light blue on worsted, also see recipe No. 1, this issue.)

RECIPE No. 6.

Bright Red on Worsted Yarn.

Acid Magenta on 100 lbs. worsted yarn.

Prepare dye bath with

1½ lbs. Acid Magenta.
(Read Holliday & Sons, Ltd., 100 William st., New York.)
10 lbs. Glauber's Salt.
4 lbs. Oil of Vitriol.

Enter in yarn at 120° F., bring to boil while turning, and turn to shade at that heat.

Acid Magenta, made and sold by the above firm, is well known to dyers, and is one of the best known colors for combining that there is, as it works slowly and evenly on the fibre. We show in this a medium dyeing. The color speaks for itself.

RECIPE No. 7.

Medium Blue on Worsted Yarn.

Anthracene Blue and Red on 100 lbs. worsted yarn.

Prepare dye bath with

1¾ lbs. Anthracene Blue S.
3 oz. Anthracene Red B.
(The Hanna Schoellkopf Co., 135 No. Water St., Philadelphia.)
2½ lbs. Acetic Acid.
10 lbs. Glauber's Salt.

Enter in yarn at 160° F., bring slowly to boil while turning, and turn to shade at that heat.

Anthracene Blue S and Anthracene Red B, when combined, produce a number of shades of blues which are fast and work very slowly and evenly on the fibre. (See 1897 recipes: 89 and 90 for shades from Anthracene Blue S, alone; 141 for shade of red from Anthracene Red B, alone; and 170 and 182 for Anthracene Blue S in combination with other Anthracene dyes for a red and a brown, respectively.)

RECIPE No. 8.

Black on Woolen Yarn.

Acid Black B 4 on 100 lbs. coarse woolen and shoddy yarn.

Prepare dye bath with

3½ lbs. Acid Black B 4.
(Anchor Color Mfg. Co., 462-466 Cherry St., New York.)
5 lbs. Oil of Vitriol.
10 lbs. Glauber's Salt.

Enter in yarn at 130° F., bring to boil while turning, and turn to shade at that heat.

Acid Black B 4 produces a bright shade on shoddy or coarse yarn, as well as on fine yarns, as the shade given here will show. It covers up burrs and specks, making the low grade of yarns look well when dyed with it. It is a concentrated and cheap color, as the shade herewith was dyed with only 3 1-2 per cent. (See recipe 128, Aug., 1897, for a black on woolen yarn.)

RECIPE No. 9.

Slate on Worsted Yarn.

Wool Black 2 on 100 lbs. worsted yarn.

Prepare dye bath with

1 lb. One-dip Wool Black 2.
(T. Bairstow, 211 Pearl St., New York.)
¼ lb. Oxalic Acid.
¼ lb. Oil of Vitriol.

Enter in yarn at 120° F., bring to boil while turning, and turn one hour at that heat.

Wool Black 2 will dye light shades

perfectly level, and can be used successfully to dye slates, pearls, grays, etc., at a very reasonable cost, and as it is a one-dip dye, it will be found very valuable. It is fast to all tests. (See recipe 161, Nov., 1897, for a pearl shade.)

RECIPE NO. 10.

Dark Blue on Cotton Yarn.

Direct Indigo Blue B K on 100 pounds cotton yarn.

Prepare dye bath with

4 lbs. Direct Indigo Blue B K.
(A. Klipstein & Co., 122 Pearl St., New York.)
15 lbs. Common Salt.
4 lbs. Sal Soda.

Enter in yarn at boil, and turn one hour at that heat.

We show a fine shade of indigo blue, dyed in one dip, which is very fast and cheap, and quickly dyed. It works very level on the fibre. This dye, like Indigo Blue B N, shown in 1897, recipe 191, will combine with all direct dyes, and can be diazotized and developed.

RECIPE NO. 11.

Brown on Cotton Knit Goods.

Thiocatechine on 100 pounds cotton knit goods.

Prepare dye bath with

10 lbs. Thiocatechine 3.
(Sykes & Street, 85 Water St., New York.)
10 lbs. Common Salt.
10 lbs. Carbonate of Soda.

Enter in cloth at 140° F. Bring temperature up to 200° F., while turning, and turn one hour at that heat. Lift out, wash, and enter second bath of

5 lbs. Bichromate of Potash.
5 lbs. Oil of Vitriol.

Turn one hour at 140° F., and rinse.

Thiocatechine 3 is another one of this series of colors that produces fine cutch shades, from the lightest tint to a full shade of brown. Thiocatechine will act as a mordant for basic dyes, in the same manner as sumac or tannic acid. Thiocatechine produces fast shades, and dyes perfectly level. A somewhat darker shade can be produced by using blue vitriol and oil of vitriol. For dark shades, the dye bath can be retained and less color can be used for future baths. (See 1897 recipes Nos. 66 and 94 for orange and golden brown shades, respectively, from Thiocatechine.)

RECIPE NO. 12.

Dark Blue on Cotton Yarn.

Diamine Dark Blue B on 100 lbs. cotton yarn.

Prepare dye bath with

1½ lbs. Diamine Dark Blue B.
(Wm. J. Matheson & Co., 178 Front St., New York.)
2 lbs. Sal Soda.
20 lbs. Glauber's Salt.

Enter in yarn at boil, turn one hour at that heat, lift out and pass through a second bath of

1½ lbs. Sulphate Copper.
1 lb. Bichromate of Potash.
¼ lb. Acetic Acid.

Turn one-half hour at heat of 160° to 180° F. Rinse.

The blue here given, when topped with Sulphate of Copper and Bichromate of Potash, produces a very fast shade against soap; and the color will not bleed or run into white or light shades when washed together. (See recipe 183, Dec., 1897, for a dark blue shade.)

RECIPE NO. 13.

Medium Blue on Cotton Yarn.

Alizarine Blue D R on 100 lbs. cotton yarn.

Prepare dye bath with

2 lbs. Alizarine Blue D R.
(Victor Koechl & Co., 79 Murray St., New York.)
50 lbs. Common Salt.
2 lbs. Sal Ammonia.

Enter in yarn at 110° F., bring to boil and turn 45 minutes at that heat.

Alizarine Blue D R dyes a redder shade of Blue than D B, shown last month. It is a very full and deep shade of navy blue. It can be treated after dyeing with chrome or blue vitriol, making a very fast color. (See 1897 recipes Nos. 179 and 189, for shades of blue from Alizarine Blue D G and Alizarine Blue D B, respectively.)

RECIPE NO. 14.

Pink on Cotton Yarn.

Rhodamine 3 G on 100 pounds cotton yarn.

Mordant in the usual way with

Tannic Acid,
Tartar Emetic,

and dye in a bath with

¾ lb. Rhodamine 3 G.
(C. Bischoff & Co., 87 Park Place, New York.)

Enter in cloth at 90° F., bring temperature up to 120° F., and turn to shade at that heat.

Rhodamine 3 G produces fine shades of pink and rose colors. Rhodamine 3 G and New Acridine Orange G, in combination, produces very fine colors. (See 1897 recipes Nos. 73, 82 and 122, for pink shades from Rhodamine 5 G, and Nos. 165 and 177 for orange shades from Acridine Orange G.)

RECIPE NO. 15.

Green on Worsted Yarn.

Alizarine Green C on 100 lbs. worsted yarn.

Prepare dye bath with

3 lbs. Alizarine Green C.
1 lb. Chinoline Yellow.
(Farbenfabriken of Elberfeld Co., 77 William St., New York.)
4 lbs. Sulphuric Acid.
10 lbs. Glauber's Salt.

Enter in yarn at 120° F., bring to boil while turning, and turn one to one and a half hours at that heat. Lift and wash.

Alizarine Green C dyes either in one dip with sulphuric acid or can be dyed on a chrome and tartar mordant, producing fast shades. By either method, the addition of Chinoline Yellow to the bath will give brilliant shades toward the yellow. (See 1897 recipes Nos. 171 and 190 for green shades from Alizarine Green C, used alone.)

RECIPE NO. 16.

Black on Satinet.

Columbia Black F B on 100 lbs. dark shoddy weft and white cotton warp cloth.

Prepare dye bath with

30 oz. Columbia Black F B.
2 lbs. Wool Black B.
½ lb. Wool Black 6 B.
(New York & Boston Dyewood Co., 55 Beekman St., New York.)
7 lbs. Glauber's Salt.

Enter in cloth at 120° F., bring up to boil in 1 1-2 hours, then run 1-2 hour longer with steam shut off. Rinse.

For dyeing an even shade on dark stock cloth, the above combination of colors is well adapted, and is especially suitable for cloth like the specimen here shown. The line of colors here shown will be found to be very useful to dyers. (See 1897 recipe No. 188 for a combination of Columbia Black F B, Wool Black, and Guinea Violet 4 B for a shade of black on shoddy union cloth.)

New Dyes.

We show in this issue some popular dyes, to which we desire to call particular attention.

A light blue on worsted yarn is seen in recipe No. 1, obtained from Eriocyanine, furnished by John J. Keller & Co., New York. In recipe No. 5 appears a companion dye, known as Erioglaucine. Both of these wool dyestuffs are comparatively new, producing fine, bright and fast blues, dyeing raw wool, yarn or piece goods perfectly level, with Sulphuric Acid and Glauber's Salt. Eriocyanine possesses all of the good dyeing qualities of Erioglaucine, but of a redder tone of color, more on the order of Acid Violet Blue shade.

In recipe No. 3, we show a black on mixed cotton and wool flannel, obtained from Union Black B, supplied by the New York & Boston Dyewood Co., New York. This dye is especially adapted to the dyeing of mixed materials in one bath, and dyeing the cotton and wool to the same shade. The application of this dye corresponds to the general method of dyeing substantive colors on union material. The baths do not exhaust, and can be employed for further batches. It is particularly good for garment dyeing.

In recipe No. 6 will be found a particularly attractive dye (Acid Magenta), furnished by Read Holliday & Sons, New York. The dye is well

known in the dyehouse, and is particularly useful for combinations with other dyes. We refer to our dyer's comments.

A medium blue on cotton yarn appears in recipe No. 13, obtained from Alizarine Blue D R, furnished by Victor Koechl & Co., New York. We have shown in previous recipes other brands of this blue, all of which are used on cotton, either in the yarn or piece, and also on wool mixed goods.

In recipe No. 15 appears a new dye, known as Chinoline Yellow, furnished by Farbenfabriken of Elberfeld Co., New York. Its combination with Alizarine Green C is interesting. This dye is sometimes known as Quinoline Yellow, and is among the greenest of yellow wool colors; stands alkali, acid and sulphur, and is very fast to light. It may be used alone or in combination, to produce particularly clear and fiery shades.

New Methods for Reporting Starch Analyses.

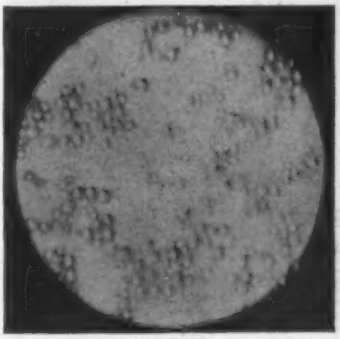
DR. H. HUNTINGTON.

In the laboratory we have had occasion recently to make analyses of some mixed starches, and it occurred to the management of the laboratory that if micro-photographs could be appended to the certificates of analyses, that the report would be in very much more tangible shape. The working out of the details proved to be very much more troublesome than was anticipated, but means were found for overcoming all obstacles, and herewith are given some micro-photographs of wheat starch, corn starch, and potato starch. The latter micro-photograph was taken with polarized light. It is worth the while to say something about the nomenclature of starches, for the reason that some confusion has arisen. In French, "amidon" comprises starch obtained from all cereals, while "fecule" comprises such starches as potato and sago. In German, "Farina" is the larger term, and "stärke" is the narrower. In English, the term starch is applied independently of its particular source.

The relative tenacity of starches can be determined by weighing out equal weights of each sample, mixing with equal volumes of water, boiling briskly for three minutes, constantly stirring and then pouring into a conical test-glass and allowing to stand for precisely two hours. Some flat round pieces of sheet brass are laid on the surface of the jelly in each glass, and weights are added till the surface is broken, and the disc begins to sink in.

Starch is sometimes deteriorated by the presence of nitrogenous matter. To detect this, dissolve one part of mercury in two parts of nitric acid of 50 deg. Tw. at a gentle heat. When dissolved, boil the liquid for a few minutes. If the sample is colored reddish when boiled with this re-agent, nitrogenous matter is present.

In the laboratory, the following determinations are made: Ash; viscos-



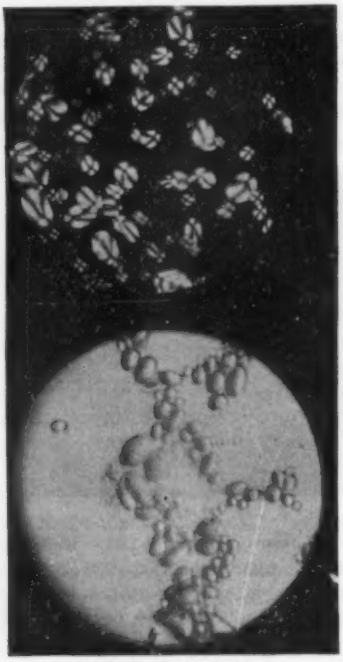
WHEAT.

ity; moisture (allowing 15%); Fehling's solution test; grit; taste. If there is considerable ash the starch is tested for sulphates, chlorides, mineral-white gypsum and china clay.

Pure wheat-flour is almost entirely dissolved in a solution of potash, containing twelve per cent. of the alkali; but mineral substances used for the purpose of adulteration remain undissolved. In some cases the microscopic examination is aided by an application of a solution of potash. Thus we may readily detect the mixture of wheat-flour with either potato-starch, or meal of peas or beans, by the addition of a little water to a small quantity of the flour, then, by adding a few drops of a solution of potash, the granules of the potato-starch will im-

mediately swell up, and acquire three or four times their natural size; while those of the wheat-starch are scarcely affected. If adulterated with pea or bean meal, the hexagonal tissue of the seed is at the same time rendered very obvious under the microscope.

Sometimes simply boiling starches with water alone will give a characteristic test; arrow-root starch is odorless; a mixture of arrow-root and potato has a peculiar odor. Again, if a mixture of potato and arrow-root is suspected, it can be discovered by boiling with muriatic acid, when an odor of



POTATO POLARIZED.

beans will be evolved if there is a mixture, whereas in the arrow-root alone, there will be no odor at all. If one part of the suspected sample is triturated with two parts of muriatic acid, a transparent jelly will be made if flour or potato starch is present; but if the sample of arrow-root is pure, the mucilage will be white and opaque. Ground rice will also behave in a similar manner, and must be looked for by the microscope. The value of starch depends upon the quantity of water which is required to produce the sufficiently adhesive mass, and it is the better, the longer the time it takes for the mixture to break up or become watery. For examination of a given article, 5 pints of starch are mixed with 20 pints of cold water, and then 230 pints boiling water are added and thoroughly stirred. When the mixture has become cold and set, a part of it is placed upon a plate or slab and examined upon its consistence. The sample showing the strongest cohesion represents the best quality of starch. The paste is then left alone for several hours, but observed, and every alteration noted. That which is the last to become waterish, and retains its consistency the longest, is the best among several samples. The reaction of starch ought to be neutral; if it shows alkaline reaction, it should be rejected, as it is in that case apt to cause trouble in finishing. The formation of a gelatinous paste is accelerated by adding caustic potash, and for that reason, some dealers add this impurity.

Starch is sometimes injured by some of the gluten of the flour being left in. Such a starch does not keep well, soon goes watery, or putrefies, emitting bad smells. By scattering a little of this kind of starch upon a red hot iron plate, the gluten makes itself apparent, by giving off a disagreeable animal smell like burning woolen, or leather, or the hoofs of horses. This kind of starch has never a good color, and if in crystals, has a flinty hardness. Good starch does not contain more than ten or fifteen per cent. of water; the latter is the largest quantity it should use in drying, at moderate temperatures.

The usual method for the determination of starch is to invert by the action of dilute acid, nitric acid, and then determine the dextrose produced by Fehling's solution. One hundred parts of dextrose are taken as equivalent to ninety of starch. The portions for the iodine test are: One gram starch stirred to a cream with a little cold water, then add 60 c. c. hot water, and the whole is boiled; of this mixture, three drops are placed in 10 c. c. wa-

ter, and the iodine colors it as soon as it is set free.

Starch sold under the name of farina is largely manufactured from decayed potatoes. Good farina should dissolve in NaOH to a clear solution.

Potato starch produces the thickest

CORN.

paste, weight for weight, because the grains are exfoliated by heating to 400 Fahr. Rice is less adhesive, and cannot be used to fix large proportions of earthy matter, clay or minerals in the fabric.

Process of Dyeing Mixed Goods.

A dyer in Manchester, N. H., has invented a process for dyeing mixed goods composed of animal and vegetable fibers, designed especially for dyeing mixed goods a fast black on both fibers. The mixed goods are said to be dyed a deep, rich, and superior black, fast to light and perspiration, without injury to the fibers—that is, without tendering the cotton and without impairing the gloss and elasticity of the wool.

The wool fiber of the mixed goods is dyed after the manner now commonly practiced in wool-dyeing, by immersing the goods in a vat or kettle containing the dyeing solution, and after boiling a predetermined length of time, the dyed goods are removed, washed well, and preferably dried.

The cotton fiber is unaffected during the dyeing of the wool, and is dyed, in accordance with this invention, by padding the partially-dyed goods with an anilin-black mixture or liquor, and when padded with the anilin-black liquor the goods are dried, and the aniline-black is then developed in an anilinager, and washed. During the process of dying the cotton with the aniline-black the color of the wool is not affected and, further, the wool fiber is not injured—that is, its elasticity and gloss or luster are not impaired, and so also the cotton fiber is not tendered during the two operations.

In order that the invention may be more clearly comprehended, we will give more in detail the process for dyeing mixed goods a fast black, and will enumerate one set of chemicals and proportions with which the inventor has secured excellent results.

For five pieces of mixed goods, each fifty yards long and thirty-six inches wide, there is employed for the wool-dyeing a bath made up as follows: To a quantity of water usually employed for dyeing the amount of cloth specified, about one hundred to one hundred and fifty gallons, which is placed in a dyeing vat or kettle of usual construction, there is added one pound, twelve ounces of so-called "alizarin-black," fifteen pounds of bisulfite of soda, and one pint of lactic acid. The mixed goods to the amount above specified are immersed in the dye-bath after the latter has reached the temperature of from 60° to 70° Fahrenheit. The goods are subjected to a gradually increasing temperature for about forty-five minutes, at the end of which time the bath is raised to the boiling-point, and maintained at the boiling-point for the further time of about forty-five minutes, during which time the wool fiber is thoroughly dyed a deep black fast to light and perspiration. The goods are then removed, washed well, and preferably dried. During the dyeing of the wool the cotton fiber is not dyed but may be stained. To dye the cotton fiber of the partially-dyed mixed goods, there is employed an anilin-black mixture or liquor, preferably made up of two parts, as follows: Boil eighteen pounds of corn-starch in twenty-two gallons of water, and add a solution of forty-eight pounds of yellow prussiate of potash and twenty-two pounds of sod-

ium chlorate in twenty-three gallons of cold water. This constitutes part No. 1 of the anilin liquor. Part No. 2 is made by dissolving one hundred and sixty pounds anilin salt (hydrochlorate) in eight gallons of hot water, to which are added twenty-four gallons of cold water.

Take twenty-eight gallons of part 1 and add ten gallons of part No. 2, which forms an anilin-black padding liquor suitable for the quantity of goods mentioned.

The anilin-black liquor is placed in the box of a foularding or padding machine containing a roller, which is below the level of the liquor, and a set of squeezing-rolls preferably covered with rubber and located above the liquor. The partially-dyed mixed goods are then run through the anilin liquor, passing under the roller and between the squeezing-rolls, and the goods on their passage through the box to the squeezing-rolls are padded with the anilin liquor, and the surplus liquor is squeezed out by the said rolls. The goods padded with the anilin-black liquor are then dried, which may be effected by passing them over hot drying-cans or through a hot flue of any suitable or usual construction. After the goods padded with the anilin-black liquor have been dried, they are run through an anilin-ager, where they are subjected to the action of steam, preferably from two and one-half to three and one-half minutes, to oxidize the anilin-black and develop it in the cotton fiber of the mixed goods. The length of time the goods are allowed to remain in the ager varies and depends on the composition of the anilin-black liquor, its concentration, and also the condition of the steam. Superior results are obtained by keeping the temperature of the steam near 220° to 225° Fahrenheit.

After the goods have been aged they are run through an open washing-machine, the first box of which contains a solution of bichromate of potash or soda, one or two ounces per gallon of water, preferably heated at 140° to 150° Fahrenheit, and then washed, soaped, washed in warm water, and dried.

Regular and superior results are said to be insured by keeping the anilin padding liquor at a constant low temperature, preferably about 40° to 50° Fahrenheit.

Mixed goods dyed black as above described are characterized by the fastness of the black, both in the wool and in the cotton to light, heat, and perspiration, and also by the depth and bloom of the shade of the color and the non-impairing of the gloss and feel of the wool, and the strength of the cotton fiber. The black of the wool is not affected by the development of the black on the cotton and retains its original luster, while the cotton fiber on the other hand is not injuriously affected during the wool-dyeing.

Mercerizing Cotton.

Editor Textile World:

Your articles in the December number, relating to mercerizing cotton, have interested me. I desire to say from my experience that cotton cloth or yarn that is subjected to this process, contract, or shrink, about 15 per cent. in length and breadth, after passing through the alkaline bath. This is one reason why manufacturers have not adopted it. The goods should be stretched, and while in that condition passed into an acid bath, sufficiently strong to neutralize the alkali, with the result of the goods acquiring a luster, or polish resembling silk, which is what the manufacturers are after.

Canada. D. S.

—Some time ago a process was published for mercerizing loose yarns by first impregnating them with strong soap solution before steeping in alkali; this treatment is supposed to yield, without contraction, a silky finish, and might be applied to fabrics. Of new mercerizing chemicals proposed, sulphide of soda is the only one; its advantages over caustic alkali are not obvious.

—Very discouraging reports have been received regarding this year's cotton crop in the neighborhood of Osaka, Japan.

QUESTIONS AND ANSWERS.

Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

Wheat and Cotton in the South.

Editor Textile World:

Will you have the kindness to favor me with your opinion as to the following: (1) The highest acreage ever planted in wheat within the cotton belt. (2) The acreage planted in wheat last season within the cotton belt. (3) The probable acreage in wheat next season within the cotton belt. (4) Is any article of produce other than wheat likely to be substituted for cotton, and if so, in what acreage? (5)Do you think that the basis of 3 pence, for cotton in Liverpool is likely to result in a decrease in planting of cotton?

Liverpool. Charles Stewart.

Our correspondent could hardly have submitted five questions relating to agricultural production in the United States more difficult to answer than those he has propounded. The last three we cannot attempt to answer. The probable acreage of wheat next season within the cotton belt; the substitution of other crops for cotton; and the precise effect upon future production of the present low price of that fibre, are in the highest degree problematical. In regard to the first two questions, we would say that the figures of wheat production, as given by the Department of Agriculture, Washington, have for several years been in very unsatisfactory shape, but we think there is no doubt that the highest acreage ever devoted to wheat within the cotton belt was in 1884, when the area harvested amounted to 3,954,190 acres. The Department of Agriculture has not, as yet, made public the results, by separate States, of its special wheat investigation, but it is certain that the acreage in wheat in the cotton States for the past season fell short of 3,000,000, and was, therefore, a million acres, or possibly a little more, less than the wheat acreage of the year 1884.

Finding Size of Coal Bunkers.

Editor Textile World:

Please tell me how to find the size of a coal bunker to hold a given number of tons of coal.

Phila., Pa. J. M. C.

To find the capacity of a coal bunker, multiply the length, width and depth (in feet) together, which will give the number of cubic feet in the bunker; dividing this by the number of cubic feet in a ton of coal, which is 24 for hard coal, and 28 for soft, gives us the number of tons the bunker will contain.

If the bunker is of irregular shape, like a vessels side, measurements will have to be made at short distances, and the average area of cross section found, and this multiplied by the length will give the cubic feet or contents.

Merino Yarn.

Editor Textile World:

Please favor me by return of mail with the names of a few mills manufacturing exclusively merino yarns. I understand that most of the woolen mills also make merino yarns. I am starting a small knitting factory, and shall want a regular supply.

Dearborn.

We have answered by mail.

Silkolene.

Editor Textile World:

Can you give me any information or recipe for making silkolene, like the enclosed sample? My interest has been aroused in it, thinking it might assist me in getting ramie into more general use. It is a question in my mind why ramie is not more generally used, as it is easily raised in this country.

New Jersey. A. W. J.

Silkolene is nothing more than mercerized cotton. There is in every number of this magazine, more or less about mercerization and new methods of accomplishing it. We have submitted the sample sent us to microscopic examination, and there is no question as to its being mercerized. The great trouble about ramie and its commercial use is the difficulty of decorticating it in sufficient commercial quantity to pay.

Changes in the Patent Law.

Editor Textile World:

Will you please inform me of the recent changes that have been made in the patent laws of this country, that went into effect at the beginning of this year?

Connecticut. W. T. S.

The most important changes in the law are the following: (a) Under the new law a patent cannot be obtained for any invention which has been patented or described in any printed publication in this

or any other country more than two years prior to the application; (b) no patent shall be refused nor shall any patent be declared invalid by reason of its first having been patented in a foreign country, unless the said application was filed more than seven months prior to the application in this country; (c) the application must be completed and prepared for examination within one year after the filing of said application. In default thereof it shall be regarded as abandoned; and (d) an interference will not be declared between an original application and a patent issued more than two years prior to the date of filing the said application.

Want Heavy Knit Goods.

Editor Textile World:

Enclosed please find $2 in payment for subscription. Will you kindly give us the names of say three firms, from whom we can buy all wool fleece underwear, also mitts and heavy German socks, goods suitable for the Klondike trade.

Tacoma.

We would suggest Wright's Health Underwear Co., 75 Franklin St., New York City, and Hygienic Fleece Lined Underwear Co., Philadelphia, Pa., for wool fleece underwear; also the Portage Underwear Co., Portage, Wis., and the Kalamazoo Knitting Co., Milwaukee, Wis., for heavy socks.

Wants Canvas Duck.

Editor Textile World:

We would like to communicate with manufacturers of duck canvas suitable for making clothing bags and packing bags. We expect to use a great deal of this, and wish to buy direct.

Klondike.

Address, Lawrence Duck Co., Lawrence, Mass.; West Point Mfg. Co., West Point, Ga.; Woodberry Mfg. Co., Baltimore Md.

The Millar Loom.

Editor Textile World:

I write to ask if you will kindly let me know the address of the owners, or their representatives of the Millar loom. I have seen this loom described in a foreign journal, and it is stated to be of American origin.

New York. R. C. P.

This loom is a recent invention, and and can scarcely be denominated a loom, but rather a combination of a loom and a knitting machine, producing peculiar fabrics, partly woven and partly knit. The patents covering the invention run from July 7, 1891, to Nov. 6, 1894, and have been granted to two men, viz: Salisbury and Millar. The patents have been granted by Great Britain, France and Belgium. The American patent stands in the possession of the inventors. At the present time, an attempt is being made to incorporate a company for the building of this loom, with a capital of $1,750,000, under the English Companies' Acts, 1862 to 1893. It is stated that the construction of the loom is such as to admit of a variety of patterns, produced by the arrangement of colored yarns. It is stated upon the authority of Roberts Beaumont, of the textile school, Leeds, that it is capable of weaving a texture containing 124 threads in a square inch, at the rate of 140 yards in ten hours, and this, he says, was not by any means the highest speed at which it might be run. He further states that if this fabric were to be woven in an ordinary power loom, the turnout per day of ten hours, would not be more than 23 yards. For army cloths, meltons, beavers and hard felted goods, he further states, the goods, for firmness and weaving qualities, are quite equal to that made by the ordinary routine of weaving. Joseph Nasmith, mill engineer, Manchester, Eng., whose opinion upon matters of this kind we value most highly, is cautious in expressing an opinion of the merits of the machine, further than that it has aroused considerable interest in the manufacturing world.

Cotton Waste.

Editor Textile World:

As I have taken your Textile World from year to year, I thought you would oblige me with a list of some of the large domestic mills that make cotton waste.

Chicago. G. H. J.

The following is a list: Massasoit Mfg. Co., Fall River, Mass.; Olmstead & Tuttle Co., Chicopee, Mass.; Bartow & Cookson, Fitchburg, Mass.; Dexter P. Lillie & Co., Indian Orchard, Mass.; Lowell Waste Co., Lowell, Mass.; Salem Waste Co., Salem, Mass.

Horse Power of Cylinder.

Editor Textile World:

What is the quickest way of finding the horse-power of a cylinder 28 inches in diameter and 42 inches in length?

Warren, Mass. W. P. R.

To find the horse-power of an engine, the mean effective pressure on the piston must be found. It is usually taken from the indicator card, but may be assumed to be from ⅓ to ½ the boiler pressure, according to the style of engine, and point of cut-off. A very easy way to memorize the method of figuring the horse-power is to take the word "P. L. A. N."

P, stands for M. E. P. (mean effective pressure).

L, stands for length of stroke in feet.

A, stands for area of piston in square inch.

N, stands for number of strokes per minute. As there are two strokes to each revolution, the total number of strokes will be twice the number of revolutions.

P × L × A × N divided by 33,000 equals the horse-power of the engine.

Cotton Braids.

Editor Textile World:

Can you give us the address of a good manufacturing concern that makes the enclosed cotton braid?

New Jersey. X.

The sample accompanying our correspondent's letter is a coarse cotton braid, in fancy effects, both in color and structure. We have sent the addresses of manufacturers by mail.

Book on Leno or Gauze Weaves.

Editor Textile World:

Will you please inform me as to the best work published on the manufacture and designing of leno, or gauze weaves.

Maryland. C. N. C.

There are several good books on this subject, and it is difficult to tell which is the best. There is no book, however, that is devoted exclusively to this subject, but very instructive chapters can be found upon it in the following: Technology of Textile Design, by E. A. Posselt; Jacquard Weaving and Designing, by T. F. Bell; Cotton Weaving and Designing, by Jno. T. Taylor; The Mechanism of Weaving, by T. W. Fox.

Fancy Back Covert Cloth.

Editor Textile World:

Have you any lay-out for heavy weight overcoating covert weave on face, with fancy back?

Connecticut. W. F. E.

Such a lay-out can be found in our February issue, 1897, page 63.

Cost of Raising Cotton.

Editor Textile World:

Can you give me an idea of the cost of raising cotton in the South?

New Hampshire. E. D. H.

Of course, this depends entirely upon conditions and situation. Roughly speaking, we should say that under present methods the cost of growing and marketing cotton, to the planter, is somewhere between six and seven cents per pound. It appears, however, that a planter by the name of E. D. Thompson, Point, S. C., in a statement made to the press of his State, says that cotton can be raised at three to four cents per pound, which has been the cost to him this year of a production from one acre of land that was experimentally cultivated for the purpose of seeing what can be done by intensive farming. If this gentleman should be written to, we think that he would state how he did it.

Back Numbers.

Editor Textile World:

I am not connected with the textile industries now, but I like to keep posted, and I consider the Textile World the best medium to do so. I have all the back numbers, commencing with July issue, 1894, in as good condition as when issued. Should you at any time hear of someone who would like to get this file, I will let them have one complete up to Dec. 1897, if they will pay express charges and my subscription to the Textile World for 1898.

Lynn, Mass. J. A.

Average Cost of Cotton.

Editor Textile World:

I have negotiated for the purchase of one hundred bales of cotton, of the following grades: 18 bales Middling Tinged; 15 bales Middling; 21 bales Low Middling; 23 bales Strict Good Ordinary; and 23 bales Good Ordinary. The price to be paid is to be determined by the rules of the New York Cotton Exchange. Can you tell me what this average price should be?

Massachusetts. F. D. W.

Taking the price of Middling cotton at 5 14-16c. per pound, the proper price for Middling Tinged would be 5 7-16c.; Low Middling, 5 7-16c.; Strict Good Ordinary, 5c.; and Good Ordinary, 4 10-16c. This would give an average of about 5¼c. for the lot, which we should say was an average price.

Cost of Making Stockings.

Editor Textile World:

Will you please inform me of a method for ascertaining the cost of manufacturing stockings, using a dozen as the unit?

Massachusetts. C. H. W.

Our correspondent is not specific enough for any satisfactory reply. He does not state the material of which he intends to make the stockings, or furnish any detail upon which to form a basis for calculation. In a very general way, we will say that he must take into consideration the following factors: interest on capital; insurance; depreciation of plant; 10 per cent.); cost of yarn(if he buys it); amount of waste made; labor for knitting, looping, seaming, dyeing, pressing, mending, folding, boxing, etc..

also, cost of paper boxes and packing boxes; rent and cartage; power; discounts; superintendence, incidentals, etc. Then divide the total expenditure by the total production, and the cost per dozen will be the result.

Book on Wool Carding.

Editor Textile World:

Will you kindly inform me of the latest book on wool carding?

Massachusetts. T. P. D.

There is no good book on wool carding, satisfactory to one working in an American mill. The best one, although rather out of date in some particulars, is Bramwell's, on this subject. The following two books are excellent ones, covering the principles of wool carding: "Woolen & Worsted Manufacture," by R. Beaumont; and "Woolen Spinning," by C. Vickerman.

Laboratory Outfit.

Editor Textile World:

I am going to fit up for myself a laboratory, on a small scale. Will you please let me know what are the necessary implements, and who keeps them for sale?

Massachusetts. E. D.

We would suggest writing to Bullock & Crenshaw, 528 Arch St., Philadelphia.

Hat, Etc. Models.

Editor Textile World:

Will you kindly inform me where I can find supplies of hat models, or blocks, and those for kid gloves, for finishing purposes, after dyeing? I want a good book for garment or piece dyers and cleaners.

Illinois. W. L.

We have replied somewhat fully by mail, concerning the blocks, etc. Get "A Handbook of Garment Dyeing and Cleaning" by Geo. H. Hurst.

Underwear Scale.

Editor Textile World:

We desire to obtain a small scale that will indicate the weight of one article and at the same time indicate the weight of a dozen. Can you give us information where we can obtain it?

Maryland. U. M. C.

We have replied by mail, giving the address of the manufacturers. There is such a scale made, with a capacity of 2 lbs.x¼ oz. The pan of the scale is of brass, 8x7, and turned up on two sides, which makes it a convenient form to receive linen wear or any article of a like nature it is desired to weigh. This scale enables one to determine not only the weight of a single article, but of one dozen.

New Publications.

Cassier's Magazine for December. New York: Cassier's Magazine Co. This number contains many articles of popular interest. Among them may be mentioned the following, all more or less illustrated: Electric Light from City Refuse, an economic disposal of wastes; Hydraulic Cranes, their development and present status; Some Interesting Applications of Hydraulic Power, hydraulic aids in a large engineering establishment; The American System of Rope Transmission, examples of modern installations and details.

Bulletin of the Bureau of American Republics for November, 1897. This is published by the United States Government, under the directorship of J. P. Smith, Washington, D. C. Among the articles treated in this number may be mentioned the following: Trade Relations in America; Financial Situation in Brazil; Argentine Republic, proposed government monopoly of the tobacco and distillery business, cotton industry; Brazil, basin of the Amazon, treaties with Chile, waterworks, city of Para; Guatemala, tariff modifications; Mexico, new government building; Manufacture of Sugar.

The Yale Review for November. Published by Tuttle Moorehouse & Taylor, New Haven, Conn. This quarterly is published for the Yale University, for the scientific discussion of economics, political and social questions, but it is committed to no party and to no school, but only to the advancement of sound learning. It aims to present the results of the most scientific and scholarly investigations in political science. The subjects treated in this number are the following: The Function of the Undertaker; Clearing House Loan Certificates—How Issued and Why; English Legislation in 1897; Some of the Contributions of Militancy to the Industrial Arts.

Appleton's Popular Science Monthly for December, 1897. New York. D. Appleton & Co. Yearly price, $5. The place occupied by this magazine is too well known for us to more than refer to it. Of the articles that appear in this number, the following may be mentioned: The Racial Geography of Europe; Are There Planets Among the Stars?; Animated Pictures; Process of Change in Pronunciation; Principles of Taxation; Our Liquor Laws as Seen by the Committee of Fifty; The Fear of Death; The Teaching of Applied Science.

Bulletin of the National Association of Wool Manufacturers, for December, 1897. Published by the Association, under the editorship of its secretary, S. N. D. North. This Bulletin has become one of the most valuable quarterly magazines that finds a special place in our libraries, and with those interested in textile manufacturing.

Elements of Cotton Spinning. By John Morris and F. Wilkinson, London and New York: Longmans, Green & Co. 12 mo. 394 pages with over 150 illustrations. Price $2.50. The authors of this work have endeavored to give a clear and concise description of the various operations which take place in the preparing and spinning of cotton. Each explanation accompanying the processes is purposely designed to give the meaning from a common-sense, rather than from a purely technical standpoint, and the

various matters are dealt with chiefly in an elementary way. It is not intended so much for the more advanced students in textile manufacturing as for those that are learning. There are special works dealing with special sections of spinning, which are better for those who desire to take up the more intricate parts of manufacturing. An idea of the work may be gathered from the following subjects, to which chapters are devoted: cotton mixing; scutching, carding, combing, drawing, and spinning machines; common derangements and remedies; humidity; mill construction; arrangement of machinery in mills; waste spinning, etc.

Commercial Directory of the American Republics. Compiled by the Bureau of American Republics, Jos. P. Smith, director, Washington, D. C. The first volume of this directory has just been issued, covering the Argentine Republic, Bolivia, Brazil, Chile, Columbia, Costa Rica, Ecuador, Faulkland Islands, Central America, Guatemala, the Guianas, Haiti, Hawaii, Honduras, and British Honduras. This directory comprises the names of manufacturers, merchants, shippers, banks and bankers, engaged in foreign trade, together with the names of officials, maps, commercial statistics, industrial data, and other information concerning the countries of the International union of American Republics, the American colonies, and Hawaii. The only object of this directory is the diffusion of valuable information of a purely commercial and industrial character, and does not attempt to deal with boundary, or any other political or diplomatic questions between the American countries, either among themselves, or with European or other American colonies. The second volume is in course of preparation. The volume is a large one, with 1070 pages.

Textile Machinery Relating to Weaving. By E. A. Posselt. Published by the author, 2152 North 21st St., Philadelphia, Pa. Price $3. including postage. Volume III. of Posselt's textile works has just been published, under the foregoing title. The work illustrates and explains the most modern makes of jacquards, card stamping machinery, etc., and other modern machinery connected with the weave-room, such as looms, spoolers, winders, warpers, etc. Only the latest and most improved machinery, devices and appliances are illustrated and explained. An abstract of the contents may give some idea of the character of the work, as the chapters on shedding mechanism; box motions and shuttle boxes; let-off mechanisms; picking mechanisms; shuttles; reeds and reed motions; heddles and harnesses, etc. Mr. Posselt has been assisted in the preparation of his work by George W. Kritler, formerly master weaver with George C. Hetzel Co., woolen manufacturer, Chester, Pa., but at present designer for Thomas H. Wilson, woolen manufacturer, Philadelphia.

Textile Manufacturers' Directory of the United States and Canada for 1897-98. Published by Textile America, 106 Grand St., New York City. This edition comprises a list of woolen, silk, jute, flax and linen manufacturers, dealers and brokers in raw material, dry goods commission merchants, jobbers and leading retailers in the United States and Canada; also, a list of dyers, bleachers, finishers, and print works of textile fabrics, with a review of the cotton, wool and silk industries. This volume is published in similar style and make-up to Babcock's Textile Directory, well known in the trade, and which it succeeds, is handsomely printed, and well bound. Price $5.

Cotton Facts. For 1897. Edited and published by Alfred B. Shepperson, Cotton Exchange Building, N. Y. 134 pages. This is an annual publication of Mr. Shepperson, and is looked upon as the leading statistical authority in the United States, pertaining to cotton. It is a compilation from official and reliable sources of the crops, receipts, exports, stocks, home and foreign consumption, visible supply, prices, and acreage of cotton for a series of years; also, the reports of condition of growing cotton crops, issued by the U. S. Agricultural Bureau, since 1879, with complete statistics of cotton manufactures, and the cotton acreage and yield of each State in the South, from the U. S. Census of 1890. A general review of the season of 1896-97 is given, and the prospects for 1897-98 will be found on its pages. The relation of the price of silver to the price of wheat is discussed, and their weekly quotations are presented in parallel columns, since 1894, in support of the contention that the price of silver has no relation whatever to the price of wheat in this country. A new table is introduced in this edition, giving the quantity of American cotton brought into sight, and the quantity taken by the world's spinners, monthly, since 1890. A description is given of the new cylindrical cotton bale, and a comparision made between it and the old system. It contains interesting statements of the cost production of cotton in Georgia and Arkansas. Anyone interested in cotton statistics cannot afford to be without it.

Recent Sales of Mill Stocks.

	Lowest	Highest
Assabet	117¼	120¼
Amoskeag	1475	1475
Amory	144	144
Bates	107	107
Border City	110	110
Cocheco	175	197½
Chicopee	48½	49½
Continental	18¼	18¾
Dwight	837½	840
Everett	60	64
Great Falls	141¾	143¾
Hargraves	100	100
Hamilton	700	700
Laconia	601¼	601¼
Lancaster	350	352½
Lyman	65	70
Lawrence	106½	106½
Merrimack	1017½	1042½
Middlesex	119¼	120
Manchester	102	102
Massachusetts	94¾	94¾
Naumkeag	69	69
Nashua	450	475
Pacific	2102½	2115
Pepperell	1325	1352½
Seaconnet	100	100
Sagamore	97½	100
Stafford	100	104
Barnard	85	88
Union	145	150
Wampanoag	105	105
Flint	101¼	103
Richard Borden	100	100
Franklin	102	102
Boott	1055	1055
Atlantic	47½	50
Sanford Spinning	93	93
Appleton	375	375
Androscoggin	112	112

Industrial News.

—The following manufacturing companies have declared dividends: Great Falls Manufacturing Co., 5 per cent.; Mass. Cotton Mills (Georgia), 3 per cent.; Pacific Mills, 5 per cent.; Shaw Stocking Co., 3 per cent.; Wamsutta Mills, 3 per cent. All for the last six months.

—J. C. Paulus, manufacturer of leather belting, for several years at 5 North 5th St., Philadelphia, will remove next month to 415 Commerce St., Philadelphia. The new locations will give Mr. Paulus larger ware room and office facilities and a building much better appointed for his growing business.

—We again call attention to the removal of the city office of Scott & Williams, builders of knitting machinery, from the cor. of Sixth and Arch Sts., to 2079 East Cumberland St., Philadelphia, Pa. This concern has a full line of their recently designed and improved hosiery and underwear machinery in the exhibition department of the Bourse, where it can be readily seen by anyone interested in such machinery. The present location of the firm's office can be reached by trolley, in about 25 minutes from the centre of the city.

—The firm of T. Bairstow & Co., importers and manufacturers of dyestuffs, 211 Pearl St., New York City, has been dissolved by the withdrawal of Mr. Steinman. Mr. T. Bairstow assumes all debts and assets of the old firm, and continues business under the name of T. Bairstow, at the old location.

—The Sawyer Woolen Mills, Dover, N. H., have been using metaline loose pulley bushings made by the North American Metaline Co., cor. West Avenue and Third St., Long Island City, New York, and are highly pleased with them.

—Albert R. Elsasser has succeeded the firm of Elsasser & Albizitti, Addingham, Pa., Philadelphia office, 421 Chestnut St. Mr. Elsasser will continue the manufacture of worsted yarns.

—The well known firm of F. Anton Ludwig & Sons, Chemnitz, Germany, who makes the full-fashioned spring-needle hosiery and underwear power frames of the improved Cotton's patent, straight and circular winders, loopers, seamers, etc., have given their sole agency for the United States, to Arthur Mueller, 754-760 Lexington Ave., Brooklyn, N. Y. who has, also, the sole agency for the celebrated Grosser knitting machines, which have obtained such a good reputation among knit goods manufacturers.

—The Berlin Iron Bridge Co., East Berlin, Ct., are furnishing and erecting the steel framework of the new foundry building of the Foxboro Foundry & Machine Co., Foxboro, Mass. The building is to be 80x140 feet. The Flushing Gas & Electric Co., Flushing, L. I., have placed with this company the contract for the extension of their generator plant, which will be built in a fire proof manner, having a steel framework and trusses, covered with corrugated iron roofing. This company has also received the contract for furnishing and erecting the steel work of the new foundry extension of the Jackson & Woodin Mfg. Co., Berwick, Pa.

—The Indian Head Cotton Mills, at Cordova, Ala., have just been completed and equipped with 25,000 spindles and 800 looms. The corporation has already made contracts to dispose of its entire product to brokers and factors in China, for a period of five years. We called upon the treasurer at his office in Boston, in regard to this contract, and he stated that he would neither confirm nor deny the statement. It is understood that the mill will not seek domestic trade, as it is not needed for a number of years to come. The inducement for locating the mill at Cordova was the grant of 600 acres of land, on which there are coal veins opening within fifty feet of the engine house, this affording fuel at lowest cost. The capital invested is held in the North.

—The Fall River Picker Co. is the name of a new concern which was organized last month, for the purpose of manufacturing loop and tail pickers, loom strapping, tug straps, bumpers, and dealing in all kinds of mill supplies. Stephen P. Frappie and James Ashton are the interested parties.

—We had the pleasure of a visit from Robert G. Henderson, agent and superintendent of the Indian Spring Woolen Mills, Madison, Me., a few days ago. Mr. Henderson is a young man, but one who has made good use of his experience in attaining his present position.

—The improved Hahn's watchman's time detector clock has met with much favor by manufacturers who have used it. This clock is sold exclusively by A. Nanz & Co., 116a Chambers St., New York City. Among the many advantages claimed for this clock is that the registering is done by numbers arranged from one to six, one to twelve, and one to eighteen, instead of marking either by holes or impressions on the dial. It always gives an exact record of the location of the watchman, at all times when he is on duty. It is so constructed as to leave the watchman no option as to whether he will perform his duties or take an occasional nap, the latter being seldom resorted to, as detection is sure to follow.

—The American Stoker Co. have removed their offices from Dayton, O., to the Garfield Building, Brooklyn, N. Y., where they occupy rooms 72, 73 and 74. This will be the business headquarters of the company in future, and all correspondence should be addressed there.

—King & Knight, Boston, Mass., have moved to 614 Atlantic Ave. This concern deals in pumps and hose, a line of rubber clothing, and boots and shoes.

—Mr. A. L. Langellier, well known to Northern manufacturers through his connection with the Southern Railway Co., as their Northern agent for the Industrial Department, has severed his connection with it, to engage in business in the Northwest. Mr. L. Scott Allen, formerly of Toccoa, Ga., succeeds him.

—Three diplomas of merit to one concern shows pretty well what the judges of the Tennessee Centennial Exposition (held at Nashville in Nov.) think of the Robertson-Thompson indicator, Lippincott planimeter and Eureka packing. Jas. L. Robertson & Sons, New York, entered these three articles and inform us they were awarded these prizes. They say if engineers and steam users would send for illustrations and descriptions of

these goods, it would not only be of interest, but of profit to them.

—The Joseph Dixon Crucible Co., of Jersey City, N. J., send to our office a welcome New Year's gift, in the form of well-assorted boxes of their pencils. Needless to say, they prove useful, and are duly appreciated. Pencils, however, form only one part of their enormous business, and although they are perhaps best known to the general public through that line of goods, manufacturers know them through their line of general lubricants and graphite goods, which includes graphite, graphite grease, cup grease, pipe joint grease, also their graphite paint. They issue an attractive booklet, called "Hints of What we Manufacture," well worth sending for.

—The Warren Chemical & Mfg. Co., 81-83 Fulton St., New York, widely known as manufacturers of roofing and paving materials, are marking the new year to their friends and customers by sending out a very attractive little pocket calendar, suited for the pocketbook or vest pocket. It is a thin sheet of tortoise shell, with calendar for 1898 printed in gilt on one side, and some facts about their business on the other. It is unique and convenient and will be preserved.

—The Holt Morgan Mills, of Fayetteville, N. C., have placed their order for cards, drawing, slubbing, intermediate and roving frames with the Howard & Bullough American Machine Co., Pawtucket. These machines will be supplied with all latest improvements, including the new top flat grinding arrangement on the cards, and also the new doffer slow motion. The drawing frames will have electric stop motions.

—The Howard & Bullough American Machine Co., of Pawtucket, are busy with a large number of orders which they now have in hand for both Northern and Southern mills. Amongst the contracts which they are now working on are revolving flat cards for the American Linen Co., Fall River; 23 pickers, 43 cards for the John P. King Mfg. Co., Augusta, Ga.; all of the picking machinery, revolving flat card drawing, slubbing, intermediate and roving frames, and 32 spinning frames for the Cedartown Cotton Mfg. Co., Cedartown Ga.; cards and spinning frames for the Glasgo Yarn Mills, Glasgo, Conn.; electric stop motion drawing frames for the Boott Cotton Mills, Lowell; picking machinery, revolving flat cards and electric stop motion drawing frames for the Barnard Mfg. Co., Fall River (this being the fourth repeat order this mill has placed with them); electric stop motion drawing, and roving frames for the Stark Mills, Manchester, N. H., besides a number of smaller orders.

—The condition of trade with Fleming & Chapin, 215 Church St., Philadelphia, is very satisfactory, and orders are being received by them of such size as to make it possible to run their mill on fuller time, and with fewer changes than they have been able to do for the last eighteen months. The output is considerably increased, although the price of their products has not materially advanced. The condition of trade however, is now such that an advance in price is anticipated.

—W. W. Altemus & Son, manufacturers of textile machinery, 2816 North 4th St. Philadelphia, advise us that their business has largely increased during the past three months, and that orders are coming in so thick that it is with much difficulty they are able to meet the demands of their customers, although working overtime every day. From present appearances this state of matters will continue for some time to come.

—The Heintz steam traps, made by William S. Haines & Co., 136 South Fourth St, Philadelphia, are most favorably received wherever they are used. The Woodstock Mills Co., Norristown, Pa., put one of these traps in, last April, and it gave such good satisfaction that four more were immediately ordered, to be followed by another order for eight more. The company writes that after the last are put to work, they will want still more.

1898 Memorandum Book.

The Howard & Bullough American Machine Co., Ltd., Pawtucket, R. I., are sending out with the compliments of the season, to their friends and customers, a very attractive leather bound daily memorandum book, which contains not only a diary for the year, but many useful tables and other information of value to a mill man. Especially so are the roving, slubbing and intermediate tables. There are also other tables for general use, including weights and measures, interest tables, useful statistics, etc., all going to make up a most attractive reminder of the company and its extended line of cotton machinery.

Industrial Dyeing and Finishing Works.

The above concern, which is a consolidation of John G. Campbell & Co., Frankford, Philadelphia, and the World Dyeing Works of Philadelphia, announce their business in this issue of the Textile World. As will be seen from their card, they are equipped for dyeing and finishing woven and knitted fabrics of all kinds, and cotton, wool and worsted yarns and warps. The Industrial Dyeing and Finishing Works is new in name only, being a union of two well known and successful concerns. John G. Campbell, Edward T. Garsed and James A. G. Campbell began the finishing business at Paul and Meadow Sts., Frankford, in 1888, with one napping machine, and upon that humble basis steadily built their trade. In 1890, they moved to larger quarters at Main and Ruan Sts., Frankford, when they added a starching and scouring department. In 1891, Mr. Garsed withdrew and Chas. S. Randall entered the firm. One year later George R. Randall also became associated. At this location, the business grew rapidly under the name of John G. Campbell & Co., until 1895, when the firm purchased a large plot at Frankford Junction and Penna. R. R. and erected a commodious brick mill equipping it with modern machinery and appointing the structure with all conveniences and comforts. The growth of the business since this last expansion has been marked, and the annexation of the kindred branch of dyeing was a natural sequence. In their latest enlargement, the concern takes a foremost position in the dyeing and finishing industry, ranking, we are told, the 3rd largest works of the kind in Philadelphia. The addition of the World Dyeing Works adds to the personnel of the firm, Thomas W. Fenton & Harry O. Sutcliffe, who are general manager and treasurer, respectively. These gentlemen have been successfully operating the World Dye Works and are thoroughly experienced in the dyeing business. The Textile World and the

trade generally will wish the new combination continued success. John G. Campbell attends to outside trade and presides at their down-town office, 240 Chestnut St., Philadelphia. Their telephone number is 50 Frankford.

—Mr. W. T. Leach, a well known knitting machine salesman and formerly connected with the manufacture of textile machinery in Philadelphia, has accepted a position with the James Smith Woolen Machinery Co., Philadelphia. Mr. Leach will sell machinery and mill supplies.

An Oyster Roast.

The Berlin Iron Bridge Co., East Berlin, Ct., gave their fifth annual oyster roast to their employees and families, at their works, December 15. Many invited guests were present, including nearly all of the city officials of Hartford. The event took place in the evening, and the great plant of the company was brilliantly lighted by electricity. The guests were received by the president, C. M. Jarvis, in a most welcome manner. Large delegations were present from Middletown, New Britain, New Haven, and elsewhere. It was estimated that there were 1800 people in and around the buildings. In the monster blacksmith shop belonging to the company, were set long tables, loaded with viands of various kinds. The occasion was thoroughly enjoyed by those that were present.

Copper Rollers.

It will be seen by their advertisement on another page that the Revere Copper Co. are in the market with Printer's Rollers.

Before seeking extensive trade for this new specialty of theirs, they have thoroughly demonstrated the excellence of their roll, and we learn that those already in use have given great satisfaction.

They claim that by their somewhat different method of treatment, the condition of the roll and its finish, both outside and in, are such as to produce a superior roller; one that will do better work and last longer.

The Merrow Machine Co.

The Merrow Machine Co., Hartford, Ct., are now installed in their new three-story brick, 100x50, building, designed and built by themselves, at 28 Laurel Street. They also have removed their Philadelphia branch office to Room 374, Bourse Building. They have one other branch office and show room, at 49 Mohawk St., Cohoes, N. Y. With these improved facilities, they are better prepared than ever before to serve their patrons and to introduce improvements in their line, which consists in the manufacture of high speeded crochet machines, for the finishing of all edges of fabrics. They will continue to add to their now extensive variety of over-edging and shell stitch machines.

Their new factory is a model plant of its kind, with large and well appointed business offices in the front, in the rear of which there is an exhibition room, where the finished products of their machines, as well as the various machines, are shown. Back of this is the boxing and experimenting department, and the stock room for steel. Contiguous to this is a large wash room, having a special locker for each man. In a one story brick ell, 36x36 feet, is the boiler room, containing a 60 h. p. boiler, with a furnace for case hardening. The building is equipped with ventilating pipes and blower, by which the air throughout the factory can be changed every seven minutes. The two upper floors are used for the manufacture of their various machines. In the centre of the second floor is the tool department, where all special tools are kept, in charge of one person, so arranged that when a workman requires a special tool, he gives its number and is held responsible for its return. The drafting room and the room for nickel plating is on the third floor. The factory is protected against fire by modern devices, as hose, fire extinguishers, automatic fire doors, etc. The company keep a stock of the various parts of their machines on hand at all times. The factory has a working capacity for one hundred employees. The reputation of the company for the superiority of their products is well known.

—Massachusetts, Newton. George F. Hall, who assumed the liabilities of the Nonantum Worsted Co. upon its failure in 1896, has anticipated the second payment to creditors, which was secured by 14 months' note, representing 30 per cent. of the claims. He is also paying a portion of the 3 years' notes, not due for nearly two years, and these payments aggregate about $300,000 making over 70 per cent. of the liabilities. The trust is discharged by these payments, and Mr. Hall takes possession of the property. A new company as recently reported, to be known as the Newton Mfg. Co., has been incorporated, with capital stock of $25,000. George F. Hall is treasurer.

—Massachusetts, Northampton. The hosiery department of Belding Bros. & Co. will hereafter be carried on under the management of Alex. McCallum. A new company known as the McCallum Hosiery Co. will be formed. Mr. McCallum recently sold his interest in the McCallum, Constable Hosiery Co., of Holyoke, which firm is now doing business under the name of the Constable Hosiery Co. The change at the Belding plant will be made Dec. 1st.

—Massachusetts, Salem. The Naumkeag Steam Cotton Mills have posted a notice that wages will be reduced 10 per cent., beginning January 3.

—Michigan, Detroit. The Glasgow Woolen Mills Co. has been chartered here with capital stock of $15,000, all paid in. Wm. C. Loftus, of New York, holds 1498 shares, and Jere J. Hartigan and Frank Rockford, of Detroit, one share each. Total number of shares is 1500.

—Missouri, St. Louis. The old St. Louis Cotton Mills have been sold to Lorraine F. Jones, of Warren Jones & Gratz, manufacturers of bagging, for $43,338. This includes the machinery. These mills have been shut down for many years, and it is thought that they will now be started up on bagging.

—New Hampshire, Lakeport. C. E. & J. J. Leavitt state that they cannot give any particulars regarding their proposed hosiery mill project in this place. They have not placed orders for any machinery, however. Something definite will probably be known by January next.

MILL NEWS.

Cotton.

New Mills.

—Georgia, Chickamauga. It is reported that C. E. Buek and other capitalists will establish a cotton mill soon, near Crawfish Springs, Ga. These parties are said to have purchased the land. It is stated that most of the capitalists are from Philadelphia.

—*Georgia, Rome. Rumors have been current that the gentlemen interested in the New York Mills, N. Y., would build a branch mill for making coarse goods at some point in Northeastern Georgia. We understand that a site about 14 miles from Rome, had been decided upon as a location. We learn that it is very likely they will build a plant at some point in Northwestern Georgia. It will probably be not more than 15,000 spindles, but that a definite statement cannot be given out at this time. They expect to decide within a few weeks what they will do in this matter.

—*Louisiana, Alexandria. Richard H. Cockerille writes us that local parties will subscribe 50 per cent. of the capital stock of the new company and a suitable site. They are trying to induce some one with capital to start a mill here, but as yet no definite steps have been taken.

—Missouri, St. Louis. The Business Men's League, of which S. M. Kennard is chairman, is endeavoring to raise $600,000 capital for a cotton mill to be built here. It is expected that one-half of this amount will be subscribed by Eastern capitalists. E. E. Prince, of St. Louis, is named as one of the interested parties.

—New York, Jamestown. E. J. Ashwell & Co. have established a lisle thread factory here. The company buys cotton thread, which by a process known as gassing, is converted into lisle thread. They are located in the Appleyard Building on Foote Ave. Mr. Ashwell of the firm is from Nottingham, Eng.

—North Carolina, Concord. The mill of the Coleman Mfg. Co. is nearly completed, and will be equipped with 7,000 to 10,000 spindles, 100 to 200 looms. This company will employ exclusively colored operatives. W. C. Coleman is secretary and treasurer.

Enlargements and Improvements.

—Alabama, Selma. The Selma Cotton Mill Co., which last August voted to increase its capital stock from $100,000 to $200,000, has opened its books for subscription to $100,000 stock. It is the intention to double the capacity of the mill, which has been run at a profit since it was started, about eighteen months ago. It is thought that this new stock will be taken by the present stockholders.

—Connecticut, Moosup. The Aldrich Mfg. Co. have put in machines for making silk, cotton, and wool braids for dress trimmings. About 50 of these machines have already been added, and this new department promises to be successful.

—*Connecticut, North Grosvenordale. The Grosvenordale Co. is placing 124 new looms in their new weaving shed. When this is done the company will have about 2,000 looms at their upper mill.

—Connecticut, Windsor Locks. J. R. Montgomery Co. is building an addition to their dyehouse, 36x72 feet, two stories.

—*Georgia, Forsyth. The new cotton mill is to be built by the Forsyth Mfg. Co. They will move their present plant out of town two miles, and add new machinery to make a total of 6000 spindles. This is in confirmation of our recent report, in which Capt. J. M. Ponder, president of the Forsyth Mfg. Co., was mentioned.

—Georgia, Lindale. We understand that the Massachusetts Cotton Mills here are putting in 65 new looms.

—Georgia, Lithonia. C. J. Hayden of Atlanta, Ga., and others have purchased the Osceolian Mill, and have organized a company to be known as the Annestown Cotton Mill, C. J. Hadan, president, John W. Haden, secretary and manager. The equipment is at present over 1,000 spindles, with 6 looms, and this equipment will probably be doubled, and the mill started at once. It is also stated that the company may put up another large mill near the Osceolian Mill, where water power sufficient for 10,000 to 15,000 spindles can be had.

—Georgia, Rock Hill. It is reported that the Arcade Mill at Rock Hill, Ga., has recently added thirty looms, which will make their total nearly 300. We understand that they have not added new spindles, but that the spinning department will be run day and night.

—Massachusetts, New Bedford. The Grinnell Mills have recently added 50 new lappet looms.

Mills Starting Up.

—*Alabama, Cordaville. The Indian Head Cotton Mills have been completed. Their equipment is 25,000 spindles and 800 looms. Total cost of the plant is said to have been $600,000. Arthur Amory, Boston, is president, and Harcourt Amory, Boston, treasurer. This mill was built entirely by Boston capital, and the entire product will be sold in China.

—Alabama, Selma. The Cawthon Cotton Mill Co., formerly known as the Matthews Cotton Mills, will soon resume operations. The mill has been put in thorough repair. The officers are: O. F. Cawthon, president; A. W. Cawthon, treasurer; R. M. Coleman, superintendent. It contains 16,000 spindles and 385 looms.

—*Connecticut, Versailles. Repairs to the Versailles mill property, which has been bought by the Uncasville Cotton Co., have been completed, and carding and spinning frames will soon be started up.

—*Connecticut, West Stafford. J. C. Perkins, treasurer Columbia Shade Cloth Co., New York, confirms our recent report that he, with W. M. Waite and F. H. Upham, will operate a thread factory in the old Washburn machine shop. The plant was started Dec. 1st, employing 30 hands. They use both steam and water power, and have a dye house.

Woolen.

New Mills.

—Connecticut, Huntington. Joseph W. Bentley started a one-set woolen mill here Oct. 1, 1897. He produces white blankets, and has 200 spindles, two broad looms, one knitting machine, a dye house, and uses water power. He expects to add eight looms if business continues good.

—*Connecticut, Mystic. The Mystic Mfg. Co. is the name of a new concern with $25,000 capital stock, in which H. A. Crowther, Eli Gledhill, T. McCarthy, and Charles Phelps are interested. They will not put up a new building, but we believe have rented the mill formerly occupied by the Greenville Co. They expect to start operations in January or February, with 50 to 60 operatives, on fine worsteds for men's suitings and trouserings. Five sets of cards, 27 looms, and one narrow loom. Steam power. They will have a dye house. Selling agents are to be Folkard & Lawrence, 725 Broadway, New York City.

—*Illinois, Springfield. The shoddy mills of Frank Godley, which were destroyed by fire Nov. 29th, will be rebuilt. The new factory will have six cards and a dye house.

—Maine, Norway. A new concern known as the Smiley Mfg. Co., will operate a plant here to make cloth. Electric power will be furnished by the Oxford Electric Light Co.

—Massachusetts, Attleboro. A local paper states that Frank Maxwell and Henry Woodard, said to be from Pittsfield, Mass., have decided upon a site here for a woolen mill, and that if favorable arrangements can be made for the land, a plant will be built here.

—Massachusetts, Clinton. The Sterling Worsted Co. is the name of the new worsted company which we mentioned last week, in which George S. Griffin, Charles Frazer, senior, and James Connell are interested. They inform us that their new building will be located on Sterling St., and they expect to have the plant finished by March, 1898. The main building will be of brick, 104 x 52, two stories, with boiler and engine room, separate. The company is not yet organized, but will have a capital of $25,000 or $30,000, two sets of cards, 20 looms, dye house, employing about 40 operatives. Steam power.

—Massachusetts, Lawrence. Regarding the new plant of Frederick Butler, formerly of the firm of Butler and Robinson, we note that it will be operated as a commission combing plant, with a capacity of five or six combs. It is possible that drawing and spinning may be added, or new combs put in, as conditions require. The building is adjoining the silk plant of E. Frank Lewis.

—*Massachusetts, Uxbridge. The plant which Charles C. Capron will start up Dec. 1st will contain five sets of cards, 32 looms, and employ from 35 to 50 hands. He will make satinets for piece dyeing and printing. This mill is run by water power.

—Massachusetts, Worcester. William C. Hall is promoting a new woolen mill, to be known as the Beaver Brook Woolen Mills Co., which will occupy the building on Beaver Brook, near Mill St. and Park Ave. It will contain 40 looms, and employ about 50 hands at the start. It is hoped that the plant will be in operation by April 1st. Mr. Hall has an office at 24 Walker Building, Worcester, and states that the machinery will be ordered at once.

Enlargements and Improvements.

—Connecticut, Baltic. The addition to the Shetucket Worsted Mills is nearly completed. A new picker house will be built, 67 x 100 feet, two stories; also a boiler house. Maguire and Penniman have the building contracts.

—*Maine, Newport. The additions to the Newport Woolen Co. have been completed, consisting of a two-story building, 75x150 feet, some drying machinery, a new burr picker, and six new Knowles looms have been set up in this new building.

—Massachusetts, Holyoke. It is reported that Beebe, Webber & Co. have leased a part of the first floor of the Whitman Building, formerly occupied by the Keating Wheel Co., and will set up 20 new looms there by Jan. 1st, which will give employment to about 30 hands. They have at present 8 sets of cards, 38 looms.

—*Massachusetts, Hudson. The Hudson Worsted Co., with Joseph Watmough, treasurer and manager, will hereafter make all kinds of worsted yarns in singles, 2, 3 and 4 ply, long and short wools. They have 1,300 worsted spindles, use steam power, and employ 40 to 50 hands. They will spin yarns on commission, delivering same on dresser spools, skeins, or barrels, yarns in single, on shuttle bobbins. This is the same concern as we recently reported as the Hudson Spinning Co. The mills started up Dec. 15th.

—Massachusetts, Lawrence. A large addition is being built by the Crescent Worsted Co., Edward Braithwaite, proprietor. It will be 16x75 feet. This will enable them to double their production. New machinery will be put in.

—*Massachusetts, Lawrence. The Crescent Worsted Co. write us regarding their addition, that it will be 72x16 feet, to be used for office, store-room, packing, shipping, etc. New machinery will be put into the basement of the mill formerly occupied for office, store-room, etc., which will double their output. This change they expect to have completed by February, 1898, and they will employ forty more hands. The president is Percy A. Legge; treasurer, Harry M. Eames; agent, Edward Braithwaite; and superintendent, Wm. Mitchell.

—Massachusetts, Lowel. The Mass. Mohair Plush Co., Boston office 86 Franklin St., inform us that they expect to move into their new building on Western Ave., Jan. 1st, 1898. This building will contain 800 worsted spindles, and give employment to 30 operatives. Their product is mohair and worsted yarns, all numbers, gray or colored, and genapped.

—Massachusetts, Pittsfield. W. E. Tillotson, proprietor of the Silver Lake Mill, has recently put in six new looms and a new 450 H. P. engine.

—*Massachusetts, Pittsfield. The Pontoosuc Woolen Manufacturing Co. has received its English machinery, and will soon have it set up in their new addition.

—Massachusetts, Pittsfield. Wilson & Horton, who recently renewed their lease of the Bel Air Mill, have made a number of improvements, putting in sprinklers, fire pumps and a new water wheel. An electric light plant will probably be added.

Knit.

New Mills.

—Alabama, Decatur. A stock company is being organized by J. T. Banks, and other citizens, to operate a knitting factory. The capital is to be $16,000. Mr. Banks contributes a three-story building for $8,000 of stock.

—*New Jersey, Saddle River. The Thurston-Clark Hosiery Co. is the name of a new company which will put up a new building to replace the mill of H. W. Thurston, recently destroyed by fire. The plant will be in operation by Jan. 1st, employing 40 hands. They will have 36 knitting machines, operated by water power, with a dye house. Product will be ladies' and children's hose and half-hose. President, Francis B. Clark, treasurer, Baylies C. Clark, superintendent, Henry W. Thurston. Selling agents, S. W. Smack, 156 Church St., New York City.

—New York, Attica. Business men of this place are trying to raise a bonus of $6000 and secure a desirable site for the location of the Fashion Knitting Mill, now in the Niagara Power Building, Buffalo, N. Y. This plant is owned by J. C. Sanford. Employment is given to about 100 hands. A building will be put up 60x150.

—*New York, Hudson. The Union Knitting Mill is being rapidly put up. It is now closed in, and work will probably be finished in a few weeks. This plant was destroyed by fire October 26.

—*North Carolina, Burlington. The new knitting mill will be known as the Daisy Hosiery Mills. The proprietors will be W. C. Curtis and J. Stewart, Jr. About ten operatives will be employed, and ten knitting machines put in. It will be in operation by January, 1898. Steam power will be used.

—*North Carolina, Roanoke Rapids. The Roanoke Underwear Co., which was proposed here last summer, has now been organized, with capital of $100,000. General manager and treasurer is James G. Pugh. They will make cotton underwear.

—Pennsylvania, Allentown. The new Excelsior knitting mill will be located on Meadow St., between Green and Washington Sts. The building will be 50x160, with engine and boiler houses. Martz & Edwards have the building contract.

—*Pennsylvania, Coopersburg. M. B. Bergery & Co. confirm the report that they are to operate a branch mill here. They are taking their coarse gauge machines from their mill at Souderton, Pa., and removing them to Coopersburg, and fitting the Souderton mill with fine gauge rib half hose machines.

—Pennsylvania, Harrisburg. Several parties, among whom is P. H. Lamey, of Wisconisco, will locate a hosiery mill on 7th St., between Maclay and Woodbine Sts., the mill to be 30x60, two stories, employing 100 hands at the start.

—*Pennsylvania, Lititz. F. B. Buck informs us that ground has been broken for a new knitting mill here, and if the weather is favorable, will probably be in running order by the second week in January. The company has not yet been organized, but will be known as the Keystone Underwear Mills. Samuel B. Erb is interested, with others. We mentioned this matter last week, but just now hear from Mr. Buch as above stated. Full particulars regarding equipment have not been decided upon.

Enlargements and Improvements.

—Delaware, Smyrna. The Bitzer Hosiery Co. has put in 15 new automatic knitting machines for making seamless hosiery.

—*Georgia, Barnesville. In regard to the addition recently mentioned, the Stafford Huguley Hosiery Co. inform us that it will accommodate 15 new knitting machines, employing ten more operatives, and will be completed and running about Feb. 1, 1898. This plant runs by steam power, and will have a total of 35 machines.

—New Jersey, Salem. It is reported that the Salem Knitting Mills, John P. Sheppard, proprietor, will be enlarged. Their present capacity is 80 knitting machines.

—*Georgia, Union Park. The Union Mfg. Co. have already started work in their new building, employing about 15 hands. They have put in 11 additional knitting machines, making the total 16. They make fine gauge hosiery, and use steam power. Sam H. Libby is president; H. S. Lavern, agent. The company will probably increase its capital stock, but to what amount has not been decided.

—*Indiana, Fort Wayne. The knitting machinery for the addition to the Wayne Knitting Mills has arrived from Germany, and it is expected that the same will be in operation within a few weeks.

—*Maryland, Frederick. The Union Mfg. Co. have nearly completed the setting up of 70 new knitting machines and 15 ribbers. They are running until 8 o'clock at night, but have been unable to keep up with orders.

—Massachusetts, Highlandville. John F. Brooks & Co. have had a new dynamo and electric lighting plant installed in their factory here.

—Massachusetts, Needham. Wye Bros. & Co., manufacturers of sweaters, golf hose, etc., are building an addition to their kniting mill on Pleasant St., and it is stated that they will put in new machinery.

—New Hampshire, Lakeport. The Winthrop Knitting Mills, manufacturing woolen hosiery, are reported as to add new machinery.

—New York, Cohoes. G. W. Kavanaugh & Co., proprietors of the Globe Mill No. 2, are building an addition.

—New York, Little Falls. John McCauley will probably add new machinery. He operates the Beaver Knitting Mill, at present equipped with 15 knitting machines, producing ribbed underwear.

—New York, Philmont. The addition recently mentioned to the High Rock Knitting Co.'s mill is not to contain any new machinery, but is to give them needed room for their present equipment. This company now has 70 knitting machines, 9 sets of woolen cards, and they are making men's fleeced lined underwear. Capital is $90,000. President, P. M. Harder; treasurer, C. N. Harder; superintendent and secretary, F. B. Harder. They inform us that they are in the market for automatic sprinklers, elevator, fire extinguisher.

—New York, West Sandlake. J. & R. McLarem have broken ground for a new dyehouse adjoining their knitting mill.

Silk.

New Mills.

—*Connecticut, Mystic. We have received an authentic report regarding the new silk velvet plant here. The name of the company is Rossie Velvet Co., of Suechtein, Germany. Address care Wm. Openhym & Sons, 42 Green St., New York City. The building will be put up by the Mystic Industrial Co., and will be ready to start Feb. 1, 1898, employing 100 hands. Robt. B. Kohn, 96 Fifth Ave., New York City, is the architect. Contract has been let and work started by general contractors H. Wales Lines Co., Meriden, Ct.

—New Jersey, Athenia. A. W. Pierson & Co. from Southport, England, have rented the mills formerly occupied by the Trinks Mfg. Co., and will operate the mill on silks and plushes. Machinery will be brought from England. It is expected that business will start in January, and before long that they will employ 500 hands.

Enlargements and Improvements.

—Connecticut, Willimantic. The Holland Mfg. Co. are building an addition to their dyehouse. Lathem, Crane & Co. have the contract.

—Maine, Westbrook. It is rumored that the Haskell Silk Co., now operating 100 looms, will set up 25 new looms in the building owned by the Westbrook Mfg. Co., called the Duck Mill.

—Maryland, Hagerstown. It is reported that the Maryland Silk Mills, Collinge & Nolan Co., proprietors, will be enlarged in the spring, and that the machinery in their Paterson, N. J., mill will be moved here, and dyehouse erected.

—New Jersey, Paterson. W. R. Close has retired from the Bunting & Close Silk Dyeing Co., and the title has been changed to the Bunting & Patton Silk Dyeing Co., A. C. Patton having become secretary and manager. The plant has been enlarged to double its original size.

—*New Jersey, Paterson. The Bunting & Patton Silk Dyeing Co., successors to the Bunting & Close and Silk Dyeing Co., as recently reported, have rented additional floor space, which will give them double the room formerly occupied. They will employ forty hands on skein silk dyeing. This company has $10,000 capital. James G. Patton is president and treasurer, and Clarke Patton, superintendent.

Facts and Gossip.

—Arkansas, Mammoth Springs. The Mammoth Spring Cotton Mill has been reorganized, with the following officers: L. T. Moore, president; E. C. Bellamy, secretary and treasurer; Sam. Tate will be general manager. The mills, which contain 3500 spindles will be started up January 1. Capital, $150,000.

—*Connecticut, Plainville. At the recent fire at the Plainville Mfg. Co.'s plant, 12 machines were disabled, but within 24 hours after the start of the fire, insurance of $3,000 had been adjusted. Seven of the machines were repaired immediately, and work resumed as soon as possible, and the plant will be run until 9 o'clock evenings for the present.

—Connecticut, Vernon. The Ravine Mills, manufacturing yarns and warps, have received several large orders, which will keep the mill running night and day for several months.

—Georgia, Atlanta. The Georgia Senate passed a House bill providing for the establishment of a textile school, as a branch of the State School of Technology in Atlanta. The bill provides $10,000, and provides that the same amount must be raised before the appropriation is available. It is expected that the requisite amount will be raised shortly, and hoped that the next legislature will increase the appropriation. This will be the first textile school in the South.

—Georgia, Columbus. The plant of the Eagle & Phoenix Co., is to be sold at auction, the up-set price to be $500,000. As reported recently, it is expected that the plant will be bought by the bondholders. It is expected that February 18 will be the date of sale. Capt. J. W. Murphey was appointed sole commissioner to conduct the sale.

—Georgia, Monroe. The Monroe Cotton Mills have started running at night, which will continue until next spring, when it is hoped that the capacity of the plant will be doubled.

—Indiana, New Albany. Regarding the bid received by the Lewisville Safety Deposit and Trust Co. on its property, December 13, Judge Herter has confirmed the sale at $30,600. The matter may be taken to the Supreme Court, however. A corporation has been organized by J. B. Gebhart, W. T. Grant, Joseph Sabel and D. Davis, called the New Albany Woolen Mill Company, to operate the plant.

—Maine, Dexter. The International Trust Co. recently took formal possession of the Dexter Woolen Mills property. An agreement has now been signed by the bondholders appointing C. W. Curtis, president of the Dexter National Bank, W. H. Judkins, treasurer Savings Bank, Dr. E. A. Thompson, president Piscataquis Savings Bank, and Parkman Dexter, treasurer Dexter Woolen Mills, a board of trustees, with authority to purchase the property at any sale which the International Trust Co. may make, and to hold the same for the benefit of the bondholders. This will enable the property to be sold by the bondholders.

—Maine, Dover. The Brown Mfg. Co. is running its furnishing department at night, to keep up with orders.

—*Maine, Fairfield. The Kennebec Worsted Co. has been incorporated, with $50,000 capital, of which $20,000 is paid in, to operate the Sampson & Williams mill here. Officers are: President, Philip Schell, New York; treasurer, Thomas Sampson. This company manufactures yarn for the N. Vassalboro mills of Sampson & Williams. They have recently put in some looms of their own.

—Maine, Guilford. The Piscataquis Woolen Mill has been running overtime of late, frequently up to midnight. There are 112 hands employed.

—Maine, Hartland. The Linn Woolen Co. are running their mill until nine o'clock evenings, turning out a fine line of cassimeres and ladies' dress goods.

—Maine, Madison. The Indian Spring Wolen Co., which has been running both night and day since last July, will hereafter run only its day force.

PERSONAL RECORD.

Personal Record.

Cotton.

—H. Creedmore has resigned his position as superintendent with the Patterson Cotton Mfg. Co., Patterson, N. C., and accepted a position as overseer of spinning at the Anchor Cotton Mill, Huntersville, N. C.

—R. M. Lindsay, who has been overseer carding at the Elm Grove Mills, Lincolnton, N. C., has resigned, and will take a similar position with the Buffalo Thread Mills, Concord, N. C. His place is taken by J. A. Lybrand, who has been overseer of night carding at Elm Grove.

—S. H. Howard is to be superintendent of the Harden Cotton Mills, Harden, N. C. He has been superintendent of the Cedar Falls Mfg. Co., Cedar Falls, N. C.

—J. B. Bailey has resigned as loom fixer for mill No. 1 at Clifton, S. C., where he has been for a number of years, and will take a similar position with the Union Mfg. Co., Union, S. C.

—E. J. Gossett has resigned his position as overseer of spinning at the cotton mills at Cowpens, S. C., and will take a similar position with the Mills Mill, Greenville, S. C.

—M. J. Withrow has resigned as overseer of weaving for the Albion Co., Albion, R. I. He was presented by his employees with a silk umbrella and gold headed cane. Mr. Withrow expects to start in the reed and heddle business.

—Charles W. Wood recently completed 25 years as general manager of the Mt. Washington Mills, Woodbury, Md. He was presented with a silver service by the employees of the company.

—Edward Chandler, who has been superintendent at the Dyerville Mfg. Co. mill at Providence, R. I., has resigned his position there, to accept a similar one at Willimantic, Ct.

—Mr. Bryant has resigned his position as overseer of weaving with the Albion Co., Albion, R. I., his place being taken by Andrew Blanding, Willimantic, Ct.

—J. H. O. Carter, son of Supt. J. F. Carter of the Kesler Cotton Mills, Salisbury, S. C., has become superintendent of the Alpine Cotton Mills, Morganton, S. C., succeeding R. L. Tate.

—Howard C. Libby, Biddeford, Me., has taken a position as overseer of carding at the Augusta Cotton Mills, Augusta, Ga.

—C. F. Bradshaw has taken G. H. Buck's place as superintendent of the Minneola Cotton Mills, Gibsonville, N. C.

—J. W. Campbell, loom fixer at the Union Cotton Mills, Union, S. C., has gone to the Lockhart Cotton Mills, Lockhart, S. C.

—Robert Butler, Alabama City, Ala., has taken charge of the weaving and cloth room of the Rock Hill cotton factory, Rock Hill, S. C.

—Jesse Davis, dyer, has gone from the Oneida Mills, Graham, N. C., to the Glencoe Mills, Burlington, N. C.

—W. C. McGinnis, who resigned his position with the Monroe Cotton Mills, Monroe, N. C., over a year ago, to accept one at the Mills Mfg. Co., Greenville, S. C., has returned to Monroe and taken charge of the carding in the mill.

—J. M. Splaun is superintendent of the Clifton Cotton Mill, Clifton, S. C.

—Frank Gradick is overseer of weaving at the Clinton Cotton Mill, Clinton, S. C.

—T. J. Johnson is overseer carding and spinning at the enlarged Clinton mill, Clinton, S. C. He was formerly overseer of carding at the Asheville mill, Asheville, N. C.

—C. R. Whitehead has been re-elected president of the Montmorency Cotton Co., Montmorency, P. Q.

—L. A. Ellenburg, who has been with the Union Cotton Mills, Union, S. C., has taken a position in the Toccoa Cotton Mills, Toccoa, Ga.

—It is said that A. M. Price, who has been superintendent of the Lincoln and the Laboratory Cotton Mills, Lincolnton, N. C., is to resign as superintendent of the Lincoln Mill, and will in future have charge of the Laboratory Mill only.

—John Mahoney, who has been boss dyer at the Highland Park Mfg. Co.'s mills, Charlotte, N. C., has resigned, and will take a similar position with the Hope Mills Mfg. Co., Hope Mills, N. C.

—James E. Stanton, Jr., is to be treasurer of the Bennett Mills at New Bedford, Mass.

—John Walsh is overseer of weaving at the Davol Mills, Fall River, Mass.

—Jack Schermer, who has been superintendent of the Selma Cotton Mills, Selma, Ala., has resigned, and will accept a position with the Charleston Cotton Mills, Charleston, S. C.

—Thomas Walters has taken charge of the carding at the Mooresville Cotton Mill, Mooresville, N. C., taking the place of Mr. Stewart, who went to China Grove.

—Fred Wagg has resigned as overseer of weaving at the Farwell Mills, Lisbon, Me., and has accepted a position in a mill at New Bedford, Mass.

—Joseph Brierly has resigned as boss spinner at the Readville cotton mills, Readville, Mass. His place is taken by Joseph Fredette of Fall River.

—W. M. Murray, who has been night spinner with the Louise Mills, Charlotte, N. C., has taken a position as superintendent of the Patterson Mfg. Co., Concord, N. C.

—G. D. Piffin is to be overseer of carding in the cotton mills at Eufaula, Ala.

—William Lothrop, New York State, has taken a position as overseer of weaving in the Farwell Mills, Lisbon, Me.

—Edward O. Knowles has gone from the Whitman mill to take a position in the Wamsutta Mill, New Bedford, Mass.

—W. R. Coggins, who has been overseer of spinning with the Aiken Mfg. Co., Bath, S. C., has taken a similar position

with the Bamberg Cotton Mills Co., Bamberg, S. C.

—A. M. Crowder, who was at one time superintendent at the Ada Cotton Mills, Charlotte, N. C., and more recently superintendent of the Henderson Cotton Mill, Henderson, N. C., is to take charge of the Cawthon Cotton Mill, Selma, Ala., which is to start up soon.

—Charles A. Cromwell has taken a position as overseer of carding in Versailles, Ct.

—Hugh Baird is to take the place of T. M. Salisbury as secretary and treasurer of the City Mills Co., Columbus, S. C.

—P. H. O'Neill, recently second hand of weaving for the Whittenton Mfg. Co., Taunton, Mass., has accepted a position as overseer of weaving for the Lorraine Mfg. Co., Pawtucket, R. I.

—J. H. Charlesworth has taken charge of weaving at the mill of the Farnsworth Co., Lisbon Centre, Me.

—P. E. O'Brien, who has had charge of weaving for the Farnsworth Co., Lisbon Centre, Me., has resigned this position and is now overseer of weaving at the Saxonville Mill, Saxonville, Mass.

—Frank Brooks has resigned his position as dyer at the Mountain Island Cotton Mills, Mountain Island, N. C., and taken a similar one with the Highland Park Mfg. Co., Charlotte, N. C.

—W. W. Owens has resigned his position as superintendent of the Harden Mfg. Co., Harden, N. C., and taken charge of the Magnolia Webbing Co.'s plant, Charlotte, N. C.

—H. C. Phillips has resigned as superintendent of H. N. Slater's cotton mill at Webster, Mass., and is now with the New York Mills, N. Y. Mills, N. Y.

—H. C. Beal, of North Adams, Mass., has taken the place made vacant at the Thorndike Co.'s No. 2 mill, Palmer, Mass., by C. H. May, overseer spinning and carding.

—The following are the overseers at the Cawthon Cotton Mill, formerly the old Matthews Cotton Mill, Selma, Ala.: A. M. Crowder, late of Charlotte, N. C., superintendent; W. E. Tisdale, overseer carding; W. W. Owens, overseer spinning; H. M. Pettes, overseer weaving.

—The vacancy at the Saundersville Cotton Mills, Saundersville, Mass., caused by the death of James Littlewood, overseer spinning, has been filled by Thomas Bentley, of Woonsocket.

—James Snape, who has been overseer of weaving at the Robeson mill, Fall River, has taken a similar position with the Granite Mill No. 3, same place.

—Mr. and Mrs. William Wood, of Bowenville, Mass., celebrated their silver wedding Dec. 1st at St. George's Hall at that place. Mr. Wood is overseer of waving in the Weetamoe mill, Fall River.

Woolen.

—Michael C. Mullen, recently in charge of night carding for the Indian Spring Woolen Co., Madison, Me., has accepted the position of second hand in the carding department of the Faulkner Mills, Lowell.

—John M. Leonard has resigned as boss carder of the Collins Mill, Collinsville, Mass., and will have charge of carding for the Faulkner Mills, Lowell, recently started up.

—Alex. Murray, recently of Lawrence, has accepted a position in the dressing department of the Schaghticoke Woolen Co., Schaghticoke, N. Y.

—A. G. Schultz has accepted the position of boss finisher and dyer for the Albany Felt Co., Albany, N. Y.

—Edward Dunham is overseer of the mixing and picking room at E. H. Shaw's mill, Wales, Mass.

—Hugh B. Frazer, overseer of the finishing department of the Jefferson Mfg. Co.'s mills, Jefferson, Mass., was called upon Thursday evening, Nov. 18th, by a number of the operatives under his charge, and presented with a gold watch chain and charm.

—John T. Campbell has returned to F. L. Sayles & Co.'s mill, Pascoag, R. I., as overseer of weaving.

—John Lenehan, who has been employed by Campbell & Henault Co., at Westerly, R. I., has taken a position as overseer of finishing in a mill at Newburgh, N. Y.

—James H. Taylor has resigned his position as superintendent of the Berkeley Woolen Mill, Wales, Mass., and gone to Philadelphia.

—John R. Cowan, who has been boss finisher at Sawyer's woolen mills, Dover, N. H., has resigned, and taken a position in a mill in Philadelphia.

—George Poole has re-entered the employ of the Sanford Mills, Sanford, Me., where he was for eight years before coming to Lowell. He established the business of the Mass. Mohair Plush Co. at the latter place.

—George H. Mee, of the Geneva Mills, Providence, R. I., will return to his old position at the Lapham Mills, Millbury, Mass., now under the management of Mayo Woolen Co.

—James P. Kennedy is again boss dyer at the Lapham Mills, Millbury, Mass., now operated by the Mayo Woolen Co.

—David A. Taylor is to take Robert H. Hart's place as superintendent and general manager of the Dayville Woolen Co.'s mills, Dayville, Ct.

—Thomas Steen, of Wales, Mass., has taken a position as boss carder with F. F. Chase, North Oxford, Mass.

—Thomas B. Grady has resigned his position as overseer of picking and carding at W. S. & F. Cordingley's shoddy mill at Newton Lower Falls, Mass., and will take a similar position with the Algonquin Co., Passaic, N. J.

—Herman Haigh has taken charge of the wool carding for the Algonquin Co., Passaic, N. J.

—John O'Brien, East Brookfield, Mass., has taken a position as boss carder with the mills of Wm. H. Coe, Jefferson, Mass.

—H. G. Morey, Salem, Va., has taken a position in C. C. Capron's mill at Uxbridge, Mass.

—John L. Ferguson has charge of the weaving in Thomas Kent & Sons' mill at Clifton Heights, Pa.

—George Saltonstall, of Pascoag, R. I., has taken a position as overseer of carding in the Burnside Mill, Shannock, R. I.

—John Rochelle, Paterson, N. J., has charge of the spinning and twisting at Wm. Broadhead & Sons' worsted mills, Jamestown, N. Y.

—John Burdick, who has been with S. A. Owen, Hope Valley, R. I., has taken a position as overseer carding for E. Kenyon & Son, Kenyon, R. I.

—James Breen, Jr., has resigned his position as dresser tender in the mills at Gilbertville, Mass., and taken a similar one with the American Mill, Rockville, Ct.

—H. I. Dodge, who has been superintendent of the Manhattan Worsted Mills, New York City, has accepted a position with the Lymansville (R. I.) Company.

—James Kilty has taken Mr. Donahoe's place as boss carder at the Dayville Woolen Mills, Killingly, Ct.

—Peter McKenna has taken the position of overseer of dyeing at the East Lake Woolen Mills, Bridgeton, N. J.

—Willis N. Anthony, recently at North Dexter, Me., has taken charge of the weave room for the Pranker Mfg. Co., Saugus, Mass.

—F. V. Bennett, formerly in the employ of P. C. Kingsbury, Homer, N. Y., has taken a position as bookkeeper at the Newton Bros.' woolen mills, same place. Zera T. Nay, formerly with Newton Bros., has taken a position in the office of W. N. Brockway.

—George F. Hussey, who has been employed at the Maple Grove woolen mill for over nine years, has recently taken charge of the dressing, spooling, twisting and skeining departments of a 22-set mill in Hinsdale, Mass.

Knit.

—Frank Walton, who has been employed by the Star Knitting Co. of Cohoes as overseer of carding for a number of years, has taken a similar position with the new Clover Knitting Co., Waterford, N. Y.

—William Gee has resigned his position as superintendent of the Hanson-Crawley Underwear Mills, Barnesville, Ga.

—C. F. Land, who has been superintendent of the Granite Knitting Mill, Cohoes, N. Y., has taken a position as bookkeeper and superintendent for the Sagamore Knitting Co., Mechanicville, N. Y.

—James B. Platt, of Braintree, Mass., has taken a position as overseer carding in the Ashland Knitting Mills, Ashland, N. H.

—The engagement is anounced of Albion K. Searles, overseer at the Harmony Mills, Cohoes, N. Y., to Miss Emeline A. Burke, of that city.

—George Sweitzer will return to his old position as boss spinner, and John Hillyer will have his old position as overseer spinning at the underwear mill of J. C. & J. C. Miller, Baldwinsville, N. Y., which is to start this month.

—Arthur Crawford has gone to Cohoes to take charge of the finishing in a knitting mill there.

Silk.

—William Stock, who has been bookkeeper at the Helvetia Silk Mill, Paterson, N. J., has started for himself in the new Hall mill.

Miscellaneous.

—Darwin G. French has become a stockholder and director in the Arnold Print Works, N. Adams, Mass.

—Perley Melvin has resigned his position with the Merrimac Print Works, Lowell, Mass., and gone to Gloucester, N. J., where he has accepted a similar position.

—Charles G. Green has accepted the position as traveling auditor of the Maine Central R. R. He recently resigned the treasurership of the Mayo Knitting Machine & Needle Co., Franklin Falls, N. H.

—The Loomfixers' Association, at its recent meeting in Adams, Mass., elected the following officers: President, William Shepard; vice-president, Charles F. Bates; financial secretary, Wm. Russell; recording secretary, Wm. Walpole; treasurer, Wm. McClemments; sergt. at arms, Abe Fielding.

—Frederick Kitchen, a well-known overseer of dyeing, has taken a position with James Foley & Co., mill supplies, 108 Pearl St., Boston.

—Ernest E. Lynn, who has been engraver at the Arnold Print Works, North Adams, Mass., is to take a similar position with the American Printing Co., Fall River, Mass.

—Charles L. White, who has been superintendent of the Manhattan Print Works, Passaic, N. J., for 20 years, is to take a position with a large manufacturing concern in San Pedro, Cal.

Marriages.

—Miss Lillian Huested, of Stillwater, N. Y., and Medard Brealt, bookkeeper at the Granite Mill, Cohoes, were married at Waterford, N. Y., Nov. 24th.

—Elmer Henry and Miss Nellie Williams, of the Odell Mills, Concord, N. C., were married Nov. 21st at that place.

—William Winston, of the Pearl Cotton Mills, N. Durham, N. C., and Miss Sallie Shaw, of the Erwin Cotton Mills, West Durham, N. C., were married Nov. 7th.

—Patrick Cunningham, wool sorter at the South Village mill, Webster, Mass., was recently married to Miss Ellen Merrigan.

—William L. Merrick, an overseer in the Methuen Co.'s mill, Methuen, Mass., and Mrs. Mabel A. (McLaughlin) Saunders, of Methuen, were married recently.

—George W. Kavanaugh, of G. W. Kavanaugh & Co., Cohoes, N. Y., and Miss Julia Richman, were recently married at Louisville, Ky.

—John J. Conway, formerly of Norwich, Ct., but employed for the past two years as electrician by the Boston Duck Co., Bondsville, Mass., and Miss Margaret T. Shea, were recently married at Bondsville.

—C. E. Shealy, of the Stanley Creek cotton mills, son of Supt. W. P. Shealy, and Miss Tessie Finger, were married recently at Stanley, N. C.

Alizarine Black

(PATENTED)

Distinguished from all other blacks by the acid test . . .

It is an acknowledged fact that woolen goods for men's wear of American manufacture, due to the more general use of Alizarine Dyes (including the Alizarine Black), are faster in color and therefore give better service to the public than the foreign goods. This is of special importance in view of the fact that our climate with the clear skies and bright sunshine is more trying to colors than in England, Germany or France

Wm. Pickhardt & Kuttroff

NEW YORK

Deaths.

—H. Wiswall, who has been treasurer of the Lanett Bleachery & Dye Works, West Point, Ga., died at Atlanta, Ga., on Nov. 15th, as the result of an accident.

—Daniel Pflantz, who was severely injured at Tillottson's mill, Pittsfield, Mass., some time ago, died recently.

—Joseph Lomax, the senior member of the carpet firm of Joseph Lomax & Sons, of Philadelphia, died Nov. 15th, age 66.

—Charles Roberts, president of the South Chester Mfg. Co., Chester, Pa., died at his home there recently.

—Charles Albro, Taunton, Mass., died at his home Nov. 13th. He entered the textile industry in 1840, and was for many years proprietor of the Hopewell Mills, Taunton, Mass.

—H. K. Messersmith, who has been bookkeeper at the Roanoke Cotton Mills, Roanoke Rapids, N. C., died Nov. 15th. He had tendered his resignation to the company just a few days before his illness.

—Henry C. Kimball, who died recently at Woonsocket, R. I., at the age of 67 years, was prominently identified with cotton manufacturing in New England. He was born in Slatersville, R. I. In 1850, he succeeded his father as manager of the Blackstone Cotton Mills, which position he held for forty years, when he resigned on account of poor health.

—Hon. Aretas Blood died in Manchester, N. H., at the age of 81, Nov. 24th. He is well known as largely interested in cotton manufacturing, and was the president of the Columbia Water Power Co., and president of the Columbia Cotton Mills.

—The many friends of R. E. Patten, Sangerville, Me., will be grieved to hear that his eldest daughter died Nov. 21st, at the age of seventeen.

—George Nichol, wool buyer for the Plymouth Woolen Co., died from heart failure at his home in Plymouth, Mass. Mr. Nichol had been employed with the Plymouth Woolen Co 26 years, and was one of Plymouth's most respected citizens.

—E. P. Robinson, who has been overseer of carding at the No. 4 mill, Lonsdale, R. I., died Dec. 1, age 35.

—Samuel Booth, the head of the firm of Samuel Booth & Co., manufacturers of woolen machinery, Clinton, Mass., died Nov. 19th, after a short illness.

—Gilman P. Hassell died at his home in Conway, Mass., Dec. 11th, age nearly 67 years. He has been connected with the woolen business the greater part of his life, having been in business with his brother-in-law, the late Edward Delabarre, of Blackstone, in Blackstone, Moosup, Ct., and Conway, Mass. About 18 years ago, Mr. Hassell retired from business, and has lived quietly on a farm in Conway ever since.

BUYERS' INDEX

Advertisers whose names do not appear under desired headings will please notify the publishers. Such omissions are accidental, not intentional.

Alphabetical Index to Advertisements follows this Classified List.

Architects and Mill Engineers.
Berlin Iron Bridge Co, The, East Berlin, Ct.
Ferguson, John W, Paterson, N. J.

Automatic Boiler Feeds.
D'Este & Seeley Co, 29 Haverhill St, Boston.

Automatic Feeds for Cotton and Wool.
Atlas Mfg. Co, Newark, N. J.
Harwood, Geo. S. & Son, 53 State St, Boston.
Kitson Machine Co, Lowell, Mass.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Balling Machine.
Torrance Mfg. Co, 18 Davis St, E. Newark, N. J.

Bandings.
See under Yarns.

Belting.
Alexander Bros., 410 No. 3d St., Phila., Pa.
Brown Bros. Co, Providence, R. I.
Danforth Belting Co, 221 Chestnut St, Phila, Pa.
Fell, Geo. & Son Bolton, England.
New Jersey Car Spring & Rubber Co, Jersey City, N. J.
Standard Mill Supply Co, 77 Exchange Pl, Providence, R. I.
Ulmer Leather Co, Norwich, Conn.
See also Mill Supplies.

Belt Dressing.
Alexander Bros, 410 No. 3d St, Phila, Pa.
Brown Bros. Co, Providence, R. I.
Danforth Belting Co, 221 Chestnut St, Philadelphia, Pa.

Bindings.
See Tapes and Braids.

Bleaching Materials.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

Bobbins, Spools, Shuttles, Etc.
Standard Mill Supply Co, 77 Exchange Pl, Providence, R. I.
Brown Bros. Co, Providence, R. I.
Woonsocket Shuttle Co, Woonsocket, R. I.

Boiler Compounds.
Imperial Chemical Co, 324 St. John St, Phila, Pa.

Boxes, Paper.
Palmer, J. S, 35 Wistar St, Germantown, Pa

Boxes, Cloth Boards, Etc.
Pearson, J. T, Kensington, Pa.

Braids.
See Tapes and Braids.

Burr Pickers.
Atlas Mfg. Co., Newark, N. J.
Curtis & Marble Machine Co., Worcester, Mass.
Sargent's, C. G., Sons, Graniteville, Mass.

Card Clothing.
Ashworth, Elijah, Fall River, Mass
Brown Bros. Co, Providence, R. I.
Farnsworth Card Clothing Co., Pittsfield, Mass.
Leigh, Evan A, 35 Mason Building, Boston.

Calico Printers' Machinery and Supplies.
New Bedford Copper Co, New Bedford, Mass.
Phillips Co, The Thomas, Providence, R. I.
See also Dyeing, Bleaching Machinery, etc.

Carders' Tools.
Brown, W. H, Mechanic St, Worcester, Mass.
Brown Bros. Co, Providence, R. I.

Carpet Machinery.
Altemus, W. W, & Son, 2816 N. 4th St, Phila, Pa.
Crompton & Knowles Loom Works, Worcester, Mass.
Curtis & Marble Machine Co, Worcester, Ms.
Furbush, M. A, & Son, Machine Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

Chemicals and Apparatus.
Bullock & Crenshaw, 528 Arch St, Phila, Pa.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

Cloth Testing Machine.
McKnight, S, 771 Broadway, New York.

Combs (Wool and Cotton).
Crabb, William, & Co, Newark, N. J.
Townsend, Thomas, 157 Orange St., Providence, R. I.

Commission Merchants.
Hayes, O. H, & Co, New York.

Copper Print Rollers.
New Bedford Copper Co, New Bedford, Mass.
Phillips Co, The Thomas, Providence, R. I.
Revere Copper Co, 174 Oliver St, Boston.

Copper Work for Dyers.
Brabender, Chas, Sr, Paterson, N. J.
Phillips Co, The Thomas, Providence, R. I.

Cotton Machinery.
Altemus, W. W, & Son, 2816 N 4th St, Phila Pa.
Ashworth, Elijah, Fall River, Mass.
Crompton & Knowles Loom Works, Worcester, Mass.
Curtis & Marble Machine Co, Worcester Mass.
Draper Company, Hopedale, Mass.
Fairmount Machine Co, 22d and Wood Sts, Philadelphia.
Howard & Bullough American Machine Co, Pawtucket, R. I.
Kilburn, Lincoln & Co, Fall River, Mass.
Kitson Machine Co, Lowell, Mass.
Leigh, Evan A, 35 Mason Building, Boston.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Payne, Geo. W, & Co, Pawtucket, R. I
Phillips Co, The Thomas, Providence, R. I.
Saco Water Power Machine Shop, Biddeford, Me.
Stoddard, Haserick, Richards & Co, Boston, Mass.
Townsend, Thomas, 157 Orange St., Providence, R. I.
Whitin Machine Wks, Whitinsville, Mass.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Cotton Openers and Lappers.
Howard & Bullough American Machine Co, Pawtucket, R. I.
Kitson Machine Co, Lowell, Mass.

Cutters for Knit Fabrics.
Kennedy, Thos. (Cutters, etc.,) Cohoes, N. Y.

Damper Regulators.
D'Este & Seeley Co. (Curtis), 29 Haverhil St, Boston, Mass.

Designers.
Fresnel, Gustave, 125 W. 56th St, N. Y.
Hand, F, & Co, Paterson, N. J.

Dryers.
Philadelphia Textile Machinery Co, Philadelphia, Pa.
Phillips Co, The Thomas, Providence, R. I.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Dusters.
See Wool and Waste Dusters.

Dyeing, Bleaching and Finishing.
Greenwood, R. & Bault, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket and Valley Falls, R. I.
Kensington Dye Works, Kensington, Pa.
Littlewood, G. J., & Sons, Manayunk, Pa.
Warren, W, Thread Works, Westfield, Mass.
Webster Dye Works, Webster, Mass.

Dyeing, Drying, Bleaching and Finishing Machinery.
Birch Bros., Somerville, Mass.
Butterworth, H. W, & Sons Co, Phila, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Co, 22 and Wood Sts, Philadelphia.
Granger Foundry & Machine Co, Providence, R. I.
Hopkins, A, & Co, Bridgeton, R. I.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Lincoln & Co, 54 Arch St, Hartford, Ct.
Parks & Woolson Machine Co, Springfield, Vt.
Phenix Iron Foundry, Providence, R. I.
Phillips, The Thomas Co, 91-95 South Main St, Providence, R. I.
Rockwell, W. S. & Co, 26 Cortlandt St, N. Y.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass. (Drying.)
Woonsocket Machine & Press Co, Woonsocket, R. I.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Dye Sticks,
Haedrich, E. M, 311 1-2 Walnut St, Phila, Pa.

Dyestuffs and Chemicals.
Anchor Color Mfg. Co, 464 Cherry St, New York.
Ashley, T. C, & Co, 145 Milk St, Boston.
Atteaux, F. E, & Co, 172 Purchase St, Boston, Mass.
Beach & Co, Hartford, Ct.
Bischoff, & Co, 87 Park Place, N. Y.
Bosson & Lane, 36 Central Wharf, Boston.
Corey, S. J, 273 Congress St, Boston
Dillon & Co, 20 Cedar St., New York.
Farbenfabriken of Elberfeld Co, 77 William St, N. Y.
Geisenheimer & Co, 189 Front St, New York.
Hanna-Schoellkopf Co, Philadelphia, Pa.
Holliday, Read, & Sons, 109 William St., New York.
Innis & Co, 120 William St, New York.
Jaeck Bros, J, 62-68 No. 11th St, Brooklyn, N. Y.
Janney, O. S, & Co, Phila. and Boston.
Johnson, Chas. A, & Co, 22 Dey St, N. Y.
Johnson, Wm. G, & Co, Uncasville, Conn.
Keller, John J, & Co, 104-106 Murray St, N. Y.
Klipstein, A, & Co, 122 Pearl St, N. Y.
Koechl, Victor, & Co, 79 Murray St., N. Y.
Matheson, W. J, & Co, 178 Front St, N. Y.
Merrimac Chemical Co, Boston, Mass.
N. Y. & Boston Dyewood Co, 55 Beekman St, New York.
Oakes Mfg. Co, 93 Pearl St, N. Y.
Phillips (Moro) Chemical Co, 131 S. 3d St, Phila., Pa.
Pickhardt & Kuttroff, New York.
Roessler & Hasslacher Chemical Co, 73 Pine St, New York.
Sharpless Dye Wood Ext. Co, 22 N. Front St, Phila, Pa.
Stamford Mfg. Co, 157 Maiden Lane, N. Y.
Stone & Ware Co, The, 157 Maiden Lane, N. Y.
Sykes & Street, 85 Water St, N. Y.
Thomas, N. Spencer, Elmira, New York.

Dyers and Finishers.
Boston Finishing Works, Williamstown Mass.
Cranston Worsted Mills (yarns), Bristol R. I.
Firth & Foster Co, Kensington, Pa.
Greenwood, R. & Bault, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket, R. I.
Industrial Dyeing & Finishing Works, 3829-45 Frankford Ave, Philadelphia.
Oakdale Dye Works, 913 W. York St, Phila, Pa.
Pawtucket Dyeing & Bleaching Co, Pawtucket, R. I.
Warren, W. Thread Works, Westfield, Mass.
Webster Dye Works, Webster, Mass.

Dyers' Clogs.
Wildman, Jos, & Co, 1908 N. Front St, Phila.

Edgings.
See Tapes, Braids and Edgings.

Electricity.
Beacon Lamp Co, New Brunswick, N. J.

Electrotyping and Printing.
J. J. Ryder & Co, 210 Westminster St, Providence, R. I.
Whitcomb, H. C, & Co, Boston.

Elevators.
Cohoes Foundry & Machine Co, Cohoes, N.Y
Howard, Geo C., 1783 Barker St., Phila., Pa
Salem Foundry & Machine Shop, Salem Mass.

Engineers, Mechanical.
Berlin Iron Bridge Co, E. Berlin, Ct.
Ferguson, John W, Paterson, N. J.

Engraving on Wood.
Ryder Co, J. J, 210 Westminster St, Providence, R. I.

Express Money Orders and Travelers' Cheques
American Express Co offices in every city

Fans—Exhaust and Ventilating.
See Ventilating Apparatus.

Feed Water Pumps.
Goulds Mfg. Co, Seneca Falls, N. Y.
Phœnix Iron Foundry, Providence, R. I.

Finishing Machinery.
See Dyeing, Drying, Bleaching and Finishing.

Fluted Rolls.
Cohoes Foundry & Machine Co, Cohoes, N Y
Thurston, A. G, & Son, Box 528, Fall River, Mass.

Fuel Oil Furnaces.
Rockwell, W. S, & Co, 27 Cortland St, N. Y.

Fulling Mills for Woolen Goods.
Hopkins, A, & Co. Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter Jas, Machine Co, No. Adams, Mass.

Gas Engines.
Jones, Lewis, 60½ and Media Sts, Phila, Pa.

Gas Singeing Machines.
Curtis & Marble Machine Co, Worcester, Ms.
Rockwell, W. S. & Co, 26 Cortlandt St, N. Y.

Gear Cutting Machine.
Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E, Co, New London, Conn.

Harness Varnish.
D. L. Witmer & Bro, 5th St. and Germantown Ave, Philadelphia.

Heating.
See Ventilating.

Heddles.
Brown Bros. Co, Providence, R. I.
Watson, L. S, Mfg. Co, Leicester, Mass.

Hosiery Boards.
Pearson, J. T, Kensington, Pa.

Hose and Rubber Goods.
Brown Bros. Co, Providence, R. I.
New Jersey Car Spring & Rubber Co, Jersey City, N. J.

Index.
Burr Index Co, 336 Asylum St, Hartford, Conn.

Ink, Stamping.
Witmer, D. L, & Bro, 5th St. and Germantown Ave, Philadelphia.

Insurance (Employers' Liability).
Employers' Liability Assurance Co, 28 Central St, Boston, Mass.

Knit Goods Edgings, Trimmings, etc.
Byram, F. A, Germantown, Pa.
Cheney Bros, Silk Goods, 479 Broome St, N. Y.

Fleming & Chapin, 229-231 Church St, Phila, Pa.
Friedberger & Co, Edgings, Germantown, Phila, Pa.
Hepner & Horwitz, Lacings, 30 Howard St, N. Y.
Krout & Fite Mfg. Co. 2632 Mascher St, Phila
Weimar Bros, 1817 East York St, Phila Pa.

Knit Goods Finishing Machines, Crochet, Etc.

Excelsior Sewing Machine Co, 20 N 7th St, Phila, Pa.
Herrow Machine Co, The, Hartford, Conn.
Nye & Tredick, 606 Arch St, Phila, Pa.
Scott & Williams, 2079 E. Cumberland St, Phila, Pa.

Knit Goods Brushers.

Andrey, S. B, & Sons, Bristol, Pa.
Jones, Lewis, Philadelphia, Pa.

Knitting Machine Cylinders.

Ashman, Stephen A, & Son, 3 Fetter Lane, Phila, Pa.
Paxton & O'Neill, 129 Bread St, Phila, Pa.
Stafford & Holt, Little Falls, N. Y.

Knitting Machinery.

Boss Knitting Machine Co, 7th and Walnut Sts, Reading, Pa.
Brinton, H, & Co, 213 Race St, Phila, Pa.
Campbell & Clute, Cohoes, N. Y.
Cooper, Chas, Bennington, Vt.
Crane Mfg. Co, Lakeport, N. H.
Eckersley, Richard, N. E. cor. American and York Sts, Philadelphia, Pa.
Excelsior Knitting Machine Co, South Bethlehem, Pa.
Hepworth & Co, Lehigh Ave. and Mascher St, Phila, Pa.
Jenckes, E. Mfg. Co, Pawtucket, R. I.
Jones, Lewis, 60 1-2 and Media Sts, Philadelphia, Pa.
Kennedy, Thos (Cutters, etc.), Cohoes, N. Y.
Keystone Knitting Machine Mfg. Co, 40 No. 7th St, Philadelphia, Pa.
Leighton Machine Co, Manchester, N. H.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
McMichael & Wildman Mfg. Co, Norristown, Pa.
Mueller, A, 760 Lexington Ave, Brooklyn, N. Y.
Nye & Tredick, 606 Arch St, Phila, Pa.
Paxton & O'Neill, 129 Bread St, Phila, Pa
Payne, G. W & Co, Pawtucket, R. I. (Winders.)
Pepper Mfg. Co, Lakeport, N. H.
Scott & Williams, 6th and Arch Sts, Phila, Pa.
Stafford & Holt, Little Falls, N. Y.
Standard Machine Co., 508 Minor St., Philadelphia, Pa.
Taylor, James, 835 Arch St, Phila, Pa.

Knitting Needles.

Breedon, Wm, & Son, Amsterdam, N. Y.
Cooper, Chas, Bennington, Vt.
Corey, Wm, Co, Manchester, N. H.
Ives, Loyal T, New Brunswick, N. J.
Keystone Knitting Machine Mfg. Co, 40 No 7th st, Philadelphia, Pa.
Leighton Machine Co, Manchester, N. H.
Lydall, H, & Foulds, Manchester, Conn.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
Page Needle Co, Chicopee Falls, Mass.
Sewing Machine Supplies Co, 72 Lincoln St, Boston, Mass.
Stoops, H. R, & Co, 66 No. 4th St, Phila, Pa.
Treat, Orion, Manchester Green, Conn.
Wardwell Needle Co, Lakeport, N. H.

Laboratory Outfits.

Bullock & Crenshaw, 528 Arch St Phila, Pa

Lamps, Electric.

Beacon Lamp Co, New Brunswick, N. J.

Looms.

Crompton & Knowles Loom Works, Worcester, Mass.
Draper Company, Hopedale, Mass.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Furbush, M. A, & Son Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St, Phila Pa. (For wire.)
Kilburn, Lincoln & Co, Fall River, Mass.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Whitin Machine Works, Whitinsville, Ms.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Loom Picker Manufacturers

Crompton & Knowles Loom Works, Worcester, Mass.
Loom Picker Co, Biddeford, Me.

Lubricators

Dixon, Jos, Crucible Co, Jersey City, N. J.

Lumber.

Stearns, A. T, Lumber Co, Neponset, Mass

Lumpers.

Gerry, George, & Son, Athol, Mass.

Machinery Dealers.

Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Schofield, Geo. L, 123 N. Front St, Phila,
Scott, James, 212 Chestnut St, Phila, Pa.

Machinery Wipers.

American Silk Mfg. Co, 311 Walnut St Philadelphia, Pa.

Machinists' Tools.

Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E. Co, New London, Conn.

Mails.

Walder, J, Paterson, N. J.

Measuring and Folding Machines.

Curtis & Marble Machine Co, Worcester, Ms
Elliott & Hall, 544 Harmon St, Worcester, Mass.

Mill Builders and Engineers.

Berlin Iron Bridge Co, The, East Berlin, Ct.
Ferguson, John W, Paterson, N. J.

Mill Supplies.

American Supply Co, Providence, R. I.
Bamford & Smith, Pascoag, R. I.
Buckley's, Benj. Son, Gun Mill, Paterson, N. J.
Harwood, Geo. S & Son, 53 State St, Boston.
Hill, Jas, Mfg. Co. Providence, R. I.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
New Jersey Car Spring & Rubber Co, Jersey City, N. J.
Spofford, Wm. S, & Son, 5-11 Culver St, Providence, R. I.
Standard Mill Supply Co, 77 Exchange Pl, Providence, R. I
Stevenson Bros. & Co, 132 So. 2d St, Philadelphia, Pa.
Thurston, A. G, & Son, Fall River, Mass.
Watson, L. S, Mfg.Co Leicester, Mass.

Napping Machines.

American Napping Machine Co, Williamstown, Mass
Andrey, S. B, & Sons, Bristol, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Jones, Lewis, 60 1-2 and Media Sts., Philadelphia, Pa.
Parks & Woolson Machine Co, Springfield Vt.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Oilless Bearings.

N. American Metalline Co, 62 W. Ave. and 3rd St, Long Island City, N. Y.

Oil Filters.

Burt Mfg. Co, Akron, Ohio.
Robertson, Jas. L, & Sons, 204 Fulton St, New York.

Paints.

American Fire Resisting Paint Co, 17 Broadway, New York.
Devoe & Reynolds, Fulton and Williams St, New York.

Pantagraphs for Mill Engraving.

Johnson, C. A, & Co, 22 Dey St, New York.

Patent Solicitors.
Crosby & Gregory, 34 School St, Boston, Mass.
Wright, Brown & Quinby, 53 State St, Boston, Mass.

Penstocks.
Dalrymple, George, Fair Haven, Vt.

Peroxide of Sodium.
Roessler & Hasslacher Chemical Co., 100 William St, New York.

Picker Sticks.
Loom Picker Co., Biddeford, Me.

Picking, Carbonizing and Garnetting.
Garfield Woolen Co, Garfield, N. J.

Pipe Covering (Magnesia).
Keasby, R. A, 54 Warren St, New York.
Keasby & Mattison Co. Ambler, Pa.
Nightingale, S. C, & Childs, Atlantic Ave, Boston, Mass.

Pneumatic Conveying.
See Ventilating.

Power Transmitting Machinery.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunter, Jas, Machine Co, No. Adams, Mass.
Kilburn, Lincoln & Co, Fall River, Mass.
Sewing Machine Supplies Co, The, 72 Lincoln St, Boston, Mass.

Presses.
Crawford. J. J, & Son, Nashua, N. H. (Power Screw, Hydraulic, Hollow Steam Plate.)
Curtis & Marble Machine Co, Worcester, Ms.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Phillips Co, The Thomas, Providence, R. I.
Pownall, F. H, Iron Works, Jamesburg, N. J.
Sullivan Machinery Co., Claremont, N. H.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Pressure Regulators for Steam and Water.
D'Este & Seeley Co. (Curtis) 29 Haverhill St, Boston, Mass.

Printers and Embossers.
Novelty Textile Printing Co, 525 W. 24th St, New York.

Pumps.
Goulds Mfg. Co, Seneca Falls, N. Y.

Reed and Harness Manufacturers.
American Supply Co, Providence, R. I.
Brown Bros. & Co, Providence, R. I.
Gowdey, J. A, & Co, Providence, R. I.
John Whitaker Reed Co, 194 Front St., Worcester, Mass.
Loom Picker Co, Biddeford, Me.
Walder, J, Paterson, N. J.

Ribbons.
Cheney Bros, S. Manchester, Ct.

Roller Skins.
Fell, Geo, & Son, Bolton, England.

Roofing, Gravel, Slag and Composition.
Armitage Mfg. Co, Richmond, Va.
Warren Chemical & Mfg. Co, 45 Fulton St, New York.

Roofing, Paint and Paper.
Armitage Mfg. Co, Richmond, Va.

Roving Cans and Sheet Metal Work for Mills.
Brown Bros. Co, Providence, R. I.
Hill, Jas, Mfg. Co, Providence, R. I.
N. E. Ventilating & Heating Co, 930 Manton Ave. Providence, R. I.
Sullivan Machinery Co, Claremont, N. H.

Saddles, Stirrups and Levers.
Dixon Lubricating Saddle Co, Bristol, R. I.

Sample Cutters.
Gleason, A. H, Rockbottom, Mass.

Schools.
Lowell Textile School, Lowell, Mass.
Philadelphia Textile School, Phila, Pa.

Sewing Machines and Supplies.
Birch Bros., Somerville, Mass
Champion Sewing Machine Co, N. W., cor American and Diamond Sts, Phila, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Dinsmore Mfg. Co, Salem, Mass.
Frame, Gibbons, 2nd and Diamond Sts, Phila, Pa.
Nye & Tredick, 606 Arch St, Phila, Pa.
Scott & Williams, 6th and Arch Sts, Phila, Pa.
Stoops, H. R, & Co, 66 No. 4th St, Phila, Pa.

Shearing Machinery.
See Dyeing, Drying, Bleaching and Finishing.

Shell Rolls.
Cohoes Foundry & Mach. Co, Cohoes, N. Y.
Thurston, A. G, & Son, Box 528, Fall River, Mass.

Shoddies.
See Wool Shoddies.

Shuttles.
See Bobbins, Spools, Shuttles, Etc.

Silk Machinery.
Crompton & Knowles Loom Works, Worcester, Mass.

Siage Plates.
New Bedford Copper Co, New Bedford, Ms.

Sizing.
American Glutrose Co. Penn Mutual Bldg, Phila, Pa.

Slashers.
Cohoes Foundry & Machine Co, Cohoes, N. Y.
Lowell Machine Shop, Lowell, Mass.
Phillips Co, The Thomas, Providence, R. I.

Soaps.
American Soap & Washolene Co, Cohoes, N. Y.
Holbrook Mfg. Co., 466 Washington St., N. Y.
India Alkali Works, Boston.
Underwood, A. J, 38 South Gate St, Worcester, Mass.

Spindles.
Buckley, Benj's, Sons, Gun Mill, Paterson, N. J.
Draper Company, Hopedale, Mass.
Ward & Vandegrift, Elmer, N. J.
Whitin Machine Wks, Whitinsville, Mass.

Spindle Tubes.
Bamford & Smith, Pascoag, R. I.

Spinning Cylinders.
Hill, Jas, Mfg. Co, Providence, R. I.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Spinning Frames.
See Cotton Machinery.

Spinning Rings.
Brown Bros. Co, Providence, R. I.
Draper Company, Hopedale, Mass.
Whitinsville Spinning Ring Co, Whitinsville, Mass.

Spinners' Supplies.
Brown Bros. Co, Providence, R. I.
Dixon Lubricating Saddle Co, Bristol, R. I.

Spinning Tubes.
Buckley, Benj's. Son, Gun Mill, Paterson, N. J.

Steam Boilers.
Brown, C. H, & Co, Fitchburg, Mass.

Steam Boiler Insurance.
Hartford Steam Boiler Inspection & Insurance Co, Hartford, Conn.
Mutual Boiler Insurance Co, 31 Milk St, Boston.

Steam Damper Regulators.
D'Este & Seeley Co, 29 Haverill St, Boston Mass.

Steam Engines.
Brown, C. H, & Co, Fitchburg, Mass.
Hooven (The), Owens & Rentschler Co, Hamilton, O.
Toomey, Frank, 131 N. 3d St, Phila, Pa,

Steam Separators.
D'Este & Seeley Co. (Curtis), 29 Haverill St., Boston.
Robertson, Jas. L, & Sons, 204 Fulton St, New York.

Steam Specialties.
D'Este & Seeley Co, 29 Haverhill St, Boston
Fuel Economizer Co, Matteawan, N. York.
Haines, W. S. C 136 South 4th St, Phila, Pa.
Robertson, Jas L, & Sons, 204 Fulton St, New York.

Steam Traps.
D'Este & Seeley Co. (Curtis) 29 Haverhill St, Boston, Mass. (return float and expansion).
Haines, W. S. C 136 South 4th St, Phila, Pa.

Tanks, Tubs and Vats.
Brabender, Chas, Sr, Paterson, N. J.
Corcoran, A. J, 11 John St, New York.
Cypress Lumber Co, Apalachicola, Fla.
Stearns, A. T, Lumber Co, Neponset, Mass.
Woolford, George, 2240 No. 9th St, Phila, Pa

Tapes, Braids and Edgings.
Fleming & Chapin, 229-231 Church St, Phila, Pa.
Friedberger & Co, Germantown, Pa.
Perseverance Mills, 2632-40 Mascher St Phila, Pa.
Weimar Bros, 1817 East York St, Phila, Pa.
Young, Wm. M, 3638-40 Frankford Ave, Philadelphia, Pa.

Teasels.
Kellogg, Thos. C, 96 Reade St, New York.
Kellogg, Wm. W, Skaneateles, N. Y.
McLaughlin Bros, Skaneateles Falls, N. Y.

Temperature Regulators.
D'Este & Seeley Co, 29 Haverhill St, Boston.
Haines, W. S. C, 136 South 4th St, Phila, Pa.

Tentering Machines.
See Dyeing, Bleaching Machinery, Etc.

Tension Pulleys.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Testing Machines.
Howard, Geo. C., 1783 Barker St., Phila., Pa

Traveler's Cheques.
American Express Company.

Turbines.
(See Water Wheels.)

Valves.
D'Este & Seeley Co, 29 Haverhill St, Boston Mass.

Ventilating Apparatus.
Berry, A. Hun, 23 W. 1st St, Boston, Mass.
Massachusetts Fan Company, Room 614, 53 State St, Boston.
New England Heating & Ventilating Co, Providence, R. I.
Philadelphia Textile Machinery Co, Hancock St, above Lehigh Ave, Phila, Pa.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Washers (Cloth).
Hopkins, A, & Co, Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Phillips Co, The Thomas, Providence, R. I.

Watchman's Clock.
Eco Magneto Clock Co, 620 Atlantic Ave, Boston.
Nanz & Co, 116 Chambers St, New York.

Water Pressure Regulators.
D'Este & Seeley Co, 29 Haverhill St, Boston.

Water Wheels.
Bradway, C. P, West Stafford, Conn.
Christiana Machine Co, Christiana, Pa.
Hunt, Rodney, Machine Co, Orange, Mass.
Leffel, James, & Co, Springfield, O.

Water Wheel Governors.
Bradway, C. P, W. Stafford, Ct.
Cohoes Foundry & Machine Co, Cohoes N. Y.
Leffel, James & Co, Springfield, Ohio.
Lombard Water Wheel Governor Co, 61 Hampshire St, Boston.

Winders. (Hosiery.)
Payne, G. W. & Co, Pawtucket, R. I.
Universal Winding Co, 226 Devonshire St, Boston.

Wood Pulleys.
Sewing Machine Supplies Co., 73 Lincoln St, Boston, Mass.

Wool.
Lyon, John H, & Co, 12 Reade St, N. Y.
Webb, Chas. J. & Co, 156 N. Front St. Phila Pa.

Wool Cleaning Compound.
India Alkali Works, Boston.

Wool Combing Machinery.
Crabb, Wm, & Co, Newark, N. J.
Crompton & Knowles Loom Works, Worcester, Mass.
Townsend, Thomas, 157 Orange St, Providence, R. I.

Wool Extracts.
Daly, Jas. E., Paterson, N. J.
Garfield Woolen Co, Garfield, N. J.
Sullivan, R. T, 155 Federal St, Boston, Mass.

Wool and Waste Dusters.
Gerry, Geo, & Son, Athol, Mass.
Sargents', C. G., Sons, Graniteville, Mass.
Stillman-Randall Machine Co, Westerly, R. I.

Woolen and Worsted Machinery.
Altemus, W. W, & Co, 2816 N. 4th St, Phila Pa.
Atlas Mfg. Co., Newark, N. J.
Crompton & Knowles Loom Works, Worcester, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Furbush, M. A. & Son Machine Co, Phila, Pa.
Harwood, Geo. S, & Son, 53 State St, Boston.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Kitson Machine Co, Lowell, Mass.
Payne, G. W. & Co, Pawtucket, R. I.
Phillips Co, The Thomas, Providence, R. I.
Sargent's, C. G., Sons, Graniteville, Mass.
Stoddard, Haserick, Richards & Co, Boston, Mass.
Woonsocket Machine & Press Co Woonsocket, R. I.

Wool, Hair and Noils.
Fowles & Co, 102 Church St, Phila.
Webb, Chas. J, & Co, 156 N. Front St, Phila Pa.

Wool Shoddies.
Bowers', James, Sons, Ltd, Chester, Pa
Daly, James E, Paterson, N. J.
Garfield Woolen Co, Garfield, N. J.
Kennebec Woolen Mills, 2025 Naudain St, Philadelphia.
Riverdale Woolen Co, Riverdale, Northbridge, Mass.

Wool Sorters and Scourers.
Kennebec Woolen Mills, 2025 Naudain St, Philadelphia.

Wool Washing, Preparing and Drying Machinery.
Kitson Machine Co, Lowell, Mass.
Phillips Co, The Thomas, Providence, R. I.
Sargent's, C. G, Sons, Graniteville, Mass.

Yarns, Threads, Etc.

Banding.

Moore, C. & Co, 12 S. 5th St, Phila, Pa.
Warren, W, Thread Works, Westfield, Mass.
Sawyer, Manning & Co, 86 and 88 Franklin St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.
Tucker & Cook Mfg. Co, Conway, Mass.
White, James F, & Co, N. Y. and Phila, Pa.
Whittier Cotton Mills, Lowell, Mass.

Carpet Yarns.

Fleming & Chapin, 229-231 Church St, Phila, Pa.

Cotton Yarns.

American Spinners' Cotton Yarn Exchange, 226 Devonshire St, Boston.
Catlin & Co, New York and Boston.
Dana Warp Mill, Westbrook, Me.
Eddy & Street, Providence, R. I.
Eichman & Sternberg, 488 Broadway, N. Y.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Hadley Co, Holyoke, Mass.
Montgomery, J. R, Co, Windsor Locks, Ct.
Monument Mills, Housatonic, Mass.
New England Thread Co, Pawtucket, R. I.
Sanford Spinning Co, Fall River, Mass.
Sawyer, Manning & Co, 86 and 88 Franklin St, N. Y.
Tucker & Cook Mfg. Co, Conway, Mass.

Cotton Warps and Yarns.

American Spinners' Cotton Yarn Exchange, 226 Devonshire St, Boston.
Clark, Wm, Co, Westerly, R. I.
Cohannet Mills, Taunton, Mass.
Eichman & Sternberg, 488 Broadway, N. Y.
Fleming & Chapin, 229-231 Church St, Phila, Pa.
Germantown Spinning Co, Germantown Pa.
Grant Yarn Co, Fitchburg, Mass.
Greene & Daniels Mfg. Co, Pawtucket, R I.
Hadley Co, Holyoke, Mass.
Hawes, O. S, & Bro, Fall River, Mass.
Holland & Webb, 487 Broadway, N. Y.
Kerr Thread Co, Fall River, Mass.
King, Alex, & Co, 54 Leonard St, New York City.
Mitchell, Jas. E, & Co, Boston and Phila, Pa.
Monument Mills, Housatonic, Mass.
Orswell Mills, Fitchburg, Mass.
Montgomery, J. R, Co, Windsor Locks, Ct.
Sanford Spinning Co, Fall River, Mass.
Sawyer, Manning & Co., 86-88 Franklin St.
White, James F, & Co, 54 56 Worth St, N. Y.

Gassed Yarns.

Greene & Daniels Mfg. Co, Pawtucket, R. I.
King, Alex, & Co, 54 Leonard St, New York.

Gased Yarns.

Blodgett & Orswell, Pawtucket, R. I.
Eichman & Sternberg, 488 Broadway, N. Y.
Fleming & Chapin, 229-231 Church St, Phila, Pa.
Kerr Thread Co, Fall River, Mass, and 29 Mercer St, N. Y.
King, Alex, & Co, 54 Leonard St, New York.
Malcolm Mills Co, Frankford, Pa.
Montgomery & Co, J. R, Windsor Locks, Ct.
Warren, W, Thread Works, Westfield, Mass.
Whittier Cotton Mills, Lowell, Mass.

Harness Twines.

Hadley Co, 95 Milk St, Boston, Mass.
Kerr Thread Co, Fall River, Mass, and 29 Mercer St, N. Y.
King, Alex, & Co, 54 Leonard St, New York.
Moore, C, & Co, 12 S. 5th St, Pilha, Pa.
Warren, W, Thread Works, Lowell, Mass.
Whittier Cotton Mills, Lowell, Mass.

Hosiery and Knitting Yarns.

American Spinners' Cotton Yarn Exchange, 226 Devonshire St, Boston.
Boyer, B. F, & Co, 516 Market St, Philadelphia, Pa.
Campbell, Geo, & Co, Phila, Pa.
Clark, Wm, Co, Westerly, R. I.
Clasgens, The J. & H. Co, New Richmond, Ohio.
Clear River Mills, Pascoag, R. I.
Cohannet Mills, Taunton, Mass.
Eichman & Sternberg, 488 Broadway, N. Y.
Fleming & Chapin, 229-231 Church St, Phila, Pa.
Germantown Spinning Co, Germantown, Pa.
Greene & Daniels Mfg. Co, Pawtucket, R. I
Holland & Webb, 487 Broadway, N. Y.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
Kerr Thread Co, Fall River, Mass.
King, Alex, & Co, 54 Leonard St, New York.
Mitchell, James E, & Co, Phila. and Boston
Monument Mills, Housatonic, Mass.
New England Thread Co, Pawtucket, R. I.
Orswell Mills, Fitchburg, Mass.
Porter Bros, 78 Worth St, New York.
Rockwell, E. M, Leominster, Mass.
Sanford Spinning Co, Fall River, Mass.
Sawyer, Manning & Co, 86-88 Franklin St, N. Y.
Shimer, Geo, & Son, 5th and Erie Sts, Camden, N. J.
Skerry, A T, & Co, 47 Leonard St, N. Y.
Walcott & Campbell Spinning Co, New York Mills, Oneida Co, N. Y.
Warren, W, Thread Works, Lowell, Mass.
White, James F, & Co, 54-56 Worth St, N. Y.
Whittier Cotton Mills, Lowell, Mass.

Jute Yarns.

Eichman & Sternberg, 488 Broadway, N. Y.

Mohair Yarns.

Eichman & Sternberg, 488 Broadway, N. Y
Holland & Webb, New York.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

Novelty Yarns, Tinsels, Silk Noils, Etc.

Cranston Worsted Mills, Bristol, R. I
Eichman & Sternberg, 488 Broadway, N. Y.
Holland & Webb, New York.
Malcolm Mills Co, 216 Chestnut St, Phila, Pa.
Montgomery & Co, J. R, Windsor Locks, Ct.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

Ramie.

Holland & Webb, New York.

Silk Noils and Yarns.

Skerry, A. T, 47 Leonard St, New York.

Silk Yarns.

Cheney Bros, S. Manchester and Hartford Ct.
Eddy & Street, Providence, R. I.
Eichman & Sternberg, 488 Broadway, N. Y.
Fleming & Chapin, 229-231 Church St, Phila, Pa.
Hawes, O. S, & Bro, Fall River, Mass.
Holland & Webb, 487 Broadway, N. Y.
Ryle, Wm, & Co, 54 Howard St, N. Y.

Woolen and Merino Yarns.

Boyer, B. F, & Co, 516 Market St, Philadelphia, Pa.
Clasgens, The J. & H. Co, New Richmond, Ohio.
Clear River Mills, Pascoag, R. I.
Eddy & Street, Providence, R. I.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
King, Alexander & Co, 54 Leonard St, N. Y.
Porter Bros, 78 Worth St, New York.
River Spinning Co, Woonsocket, R. I.
Rockwell, Edward M, Leominster, Mass.
Sawyer, Manning & Co, 86 and 88 Franklin St, N. Y.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.

Worsted Yarns.

Alleghany Worsted Mills, Phila, Pa.
Botany Worsted Mills, Passaic, N. J.
Boyer, B. F, & Co, 516 Market St, Philadelphia, Pa.
Campbell, Geo, & Co, Phila, Pa.
Cranston Worsted Mills, Bristol, R. I.
Croft, Howland, & Sons, cor. Broadway and Jefferson St, Camden, N. J.
Eichman & Sternberg, 488 Broadway, N. Y.
Herbst & Jones, 21st and Naudain Sts, Philadelphia, Pa.
King, Alexander & Co, 54 Leonard St, N. Y.
Phoenix Mills Co, 13 Letitia St, Phila, Pa.
Porter Bros, 78 Worth St, New York.
Sawyer, Manning & Co., 86-88 Franklin St, N. Y.
Shimer, Geo, & Son, 5th and Erie Sts, Camden, N. J.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.

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YOU need such goods as OIL EXTRACTORS, STEAM SEPARATORS, ENGINE INDICATORS, EXHAUST HEADS, SHAKING GRATES, etc. Why not get our catalogue before ordering.

JAMES L. ROBERTSON & SONS.

204 Courtlandt St., N. Y. 12 Pearl St., Boston

SITUATIONS WANTED.

The advertisers in the following columns should be addressed in care of TEXTILE WORLD, or inquiries concerning them may be addressed directly to "Information Department, TEXTILE WORLD," as full particulars of each advertiser are on file, and the addresses of suitable agents, superintendents and foremen for every branch of the textile industry will be furnished to manufacturers.

Any subscriber may file his application, and no charge is made until position is secured.

The business of this department is held strictly confidential.

The applications of good overseers in every department, who are in want of positions, are solicited.

Manufacturers are invited to use this department when in need of skilled men; each case will be handled confidentially, with promptness and judgment, and without charge to manufacturers.

A member of the firm is in charge of this department, and gives personal attention to each case.

WOOLEN SUPERINTENDENTS.

1219 **Superintendent.** A young man who has had a practical experience in every department of a woolen mill, including designing, wishes to secure a position as superintendent, designer or both. Is highly recommended by his present employers for whom he holds a position as overseer. His strong points are on cassimeres, cheviots and Unions.

1170 **Woolen Superintendent** wants a position as superintendent and designer of a small mill, or superintendent of a large mill. Age 54; marrried. Don't want a position in any of the Southern or Western states. Has worked on a great variety of goods, and can refer to reliable parties.

1258 **Woolen** Superintendent, Carder, Spinner or Weaver. Has experience in dyeing. Is a reliable man. 40 years old. Refers to responsible parties as to character and ability.

1203 **Superintendent, Woolen,** or superintendent and designer. Age 39; married. Has held a position as superintendent 9 years; 2 years in one mill and 7 in another. Has good references. A good man on meltons, coverts, cassimeres, worsted and kerseys; also serges.

1268 **Woolen** superintendent or designer. First-class experience in England and America. A first-class man in every way; age 34; married. Fancy worsteds, cheviots, novelty goods, cassimeres, overcoatings, cloakings, dress goods, piece dyes, worsteds and cheviots.

1305 **Superintendent and Designer** with 20 years' experience in woolen mills, on cassimeres, cheviots, worsteds and cloakings. Is now out of employment. Wants position at once.

1290 **Manufacturer from Scotland** wishes situation as superintendent; thoroughly practical in Scotch tweeds, cheviots, Saxonies, plaids, etc., from wools to finished cloth. Will start with small salary.

1255 **Felts.** The advertiser has a thorough, practical knowledge of all the details connected with the manufacture of paper makers' felts and jackets; especially adapted for fast running machines; good reason why he is now in the market; recommended by past employers.

1250 **Superintendent,** or would accept a position as designer in a good woolen mill. Understands fancy cassimeres, cloakings, dress goods, kerseys, unions and worsteds. Can produce the Jacquard effect on an ordinary cotton, Knowles loom. Refers to good mills.

1239 **A man who understands the** manufacturing of woolens in all the details, is open for an offer. Is an experienced manager, and is at present in charge of a mill that is being run at a profit.

1227 **A Superintendent** with a thorough practical training in all the departments of a woolen mill making worsted cassimeres, dress goods, cloakings, overcoatings, robes, blankets, shawls, etc. Has a thorough knowledge of designing and has held position in first class mill, to which he can refer.

1231 **Manufacturer.** One who has had a thorough experience in the management of a mill of his own, and who can show proof as to his ability, is now in the market for a position as superintendent or assistant superintendent with any good company. Age 40; married.

COTTON SUPERINTENDENTS.

1337 **Assistant Superintendent.** Expert on book binder's cloth, window shades, fan cloths, friction callender machines. 20 years with Wilson & Bentleys, London, and about 2 years employed in this country. Age 45, married. American and English references.

1332 **Supt. with long experience** in both Northern and Southern mills. Has started 3 Southern mills, on print cloths, broad and narrow sheetings and fine shirtings. First class references from all past positions. Age 48. Might accept position as overseer of large weave room.

1265 **Superintendent** wants position as superintendent of cotton cloth mill. Has had charge of each department in the mill; aged 28 years; married.

1266 **Cotton** superintendent wants position. Out on account of mill shutting down. Understands fancy and plain cottons, white and colored. Has a first-class record.

1267 **Cotton** superintendent or carder. Prints, sheetings, ginghams, fine and coarse, white and colored. Nearly all kinds of machinery. References all right. Age 47; married.

1269 **Cotton** superintendent, carder, spinner and dresser; 43; married. Has held position in some of the best mills; is strictly temperate, and well recommended. Cotton, flannels, ginghams, crochet and Marseilles quilts, etc.

1306 Young American wants position as cotton superintendent. Experience mostly on cotton warps. Has been bookkeeper, overseer of carding and spinning; also superintendent in Massachusetts mills.

WOOLEN CARDERS.

1249 **Carder and Spinner,** woolen, wants position. Familiar with a great variety of goods. 37 and married.

1248 **Carder,** woolen. Age 37 years; married. 10 years with one of the best mills in New England. Dress goods, beavers, blankets, cotton warp hair lines and kerseys.

1307 **Carder** with unusually fine record and very wide experience desires good position in New England, Central or Western States. First-class references from past positions. Age 44. Experience on cassimeres, cheviots, dress goods, broad-cloth, repellants and blankets.

1309 **Woolen Carder.** 21 years' experience in charge at first-class mills. Has worked on fancy cassimeres, cheviots, meltons and kerseys. Age 45; married. At present out of work.

1230 **Superintendent or Carder and** spinner wants position in woolen mill. Age 30; married. Can take position at once. Familiar with jeans, cassimeres, flannels, knit goods and shoddies.

1233 **Felt** Overseer of Carding. A good man on felt or woolen goods. Aged 35; married. Can refer to past employers.

1321 **Boss Carder.** Over 30 years' experience in woolen mills. American. Will except second hand position in large mill. Well up on dress goods, broadcloths, flannels, kerseys, etc. Has best references.

1314 **Woolen Carder.** American. Age 30. Married. At present employed. Experience on beavers, cassimeres, cheviots, dress goods. Well spoken of by former employers. A first class man for a small mill.

COTTON CARDERS.

1291 **Overseer of Carding and Spinning.** Would like to change from present position to something better. Familiar with Davis & Furber cards and mules, Cleveland cards, Johnson & Bassett mules Excellent references. Has been superintendent in several mills. Could also take position as assistant superintendent of hosiery mill.

1277 Young Frenchman, with wide experience and good references, wants position as boss carder. Age 38; married.

1138 Second hand of cotton carding wants position. Has had a good experience in that position. References.

1260 **Young Man** who has worked up through carding rooms of some of the best mills in New England, wants position as overseer in New England or Middle States. Age 27. Not married.

1238 **Second** hand of cotton carding. 37; married. Open for engagement.

1315 **Cotton Carder.** Over 20 years' experience as overseer in first class mills. At present employed. Well up on prints and light and heavy sheetings. Knows American and English cards, and speeders. Best references.

1320 **Cotton Carder.** 12 years' experience as overseer in first class mills. Can refer to well known mill men. Age 39. Married.

WOOLEN SPINNERS.

1299 Woolen Spinner who has had experience as second-hand would like a position as boss spinner. Would accept small salary to start. Has worked on cloakings, dress goods and Scotch tweeds in New England mill.

1287 **Young Man** wants position as boss spinner. Experience in first-class mills on cassimeres, kerseys, cheviots, satinets; knows Davis & Furber, Paul and Johnson & Bassett machines. Age 29. Wife works in mill.

1195 **Spinner, Woolen.** American; age 31; married. Experienced on yarns from 1 to 7 1-2 run. Refers to past and present employers. Wants position as overseer. Will not go to Southern States, Canada or Connecticut. Is an experienced overseer.

1112 **Overseer of Woolen Spinning** wants position. Has first-class references. Age 37. Wages reasonable. Will accept second hand's position.

1276 **Spinner,** woolen. Wool and shoddy from 1-2 to 10 run, cassimeres, flannels, dress goods, underwear and blankets. Davis & Furber, Furbush & Sons, Johnson & Basset, and Schmidt machinery. Good references.

1204 **Situation wanted** as boss spinner, or second hand and mule fixer on Pla t mules. Many years experience on yarns for dress goods in England, and also yarns for fine woolen cloth. 35 years old and married; good references.

1316 **Overseer Worsted Drawing** and spinning. Will accept first class position at $3 or more per day. At present employed in well known and first class mill. Age 42. Married. Best references from former employers.

COTTON SPINNERS.

1284 **Eleven years as Overseer** in first-class gingham mill, with other experience, has fitted this man for good position in charge of ring spinning, spooling and warping. Age 40. French American; married.

1223 **Wants position as Overseer of** Spinning or Twisting, or both. Familiar with fine or coarse numbers. Refers to past and present employers.

1272 **Second Hand** of cotton ring spinning wants position in Massachusetts, Rhode Island, Maine or New York. Age 23; married.

1280 **Wanted, situation** as overseer or second hand of mule spinning by a thorough, practical man. Good references from past and present employers. Understands all English makes of mules. Will go South or Canada.

1196 **Mule or Ring** cotton spinner wants position as overseer. Age 36; married; 12 years in one mill; 6 years as mule spinner, 2 years as second hand and 4 years as overseer. Has had a very thorough experience on tickings, shirtings and denims. Used to both English and American make of machines. References are good; can accept position at once.

1243 **Mule** spinner; cotton. Age 36; married. Prefers New York or Massachusetts; references.

WOOLEN WEAVERS.

1008 **Wants boss job in flannel mill.** Northern New England preferred, also a good man for dresser or fixer, has worked on flannels, serges, cheviots, fancy dress goods. Is 34, married.

1253 **Weaver, Designer or Superintendent** Open for a position. Refers to past and present employers. Aged 47; married. Worsted cloakings, cassimeres and dress goods.

1130 **Overseer of Woolen Weaving** wants position. Would accept 2nd hand's position in a good mill. American; protestant; age 36; single. Good man on Knowles fancy and plain looms, also Davis & Furber. Cassimeres, worsteds, meltons and flannels. Will not go South, West or Pennsylvania.

1273 **Woolen** weaver wants position. Age 35; married. A first class man.

1313 **Woolen Weaver.** First class references, and experience on fancy cassimeres, kerseys, beavers, dress goods, etc. At present not employed, for good reasons. Age 44. Married.

COTTON WEAVERS.

1297 **Overseer of Weaving.** A man of the very best standing desires a permanent position in first-class mill. He has worked in several of the best mills in New England for upwards of twenty years, and can show splendid references. Has worked on sheetings, prints, sateens, fancies, lenos and plaids. Now unemployed.

1242 **Overseer Cotton Weaving.** Familiar with plain cloths, sateens, fancy checks and stripes, box looms and dobbies. References. Age 43; married. One weaver, one twister in family.

1334 **Jacquard and Dobby Weaver** and designer on Knowles machines. 8 years' experience in this position. At present employed and can furnish excellent references. Age 38; married.

1333 **Overseer of Cotton Weaving** with more than 20 years' experience in weave rooms of N. E. and Canadian mills. Experience on all kinds of white and colored, plain and fancy work, except Jacquard, American and English, looms. Married; age 37.

1288 **Overseer of Cotton or Worsted** weaving wants position. Familiar with all kinds of looms; plain or fancy work. Age 45; married.

1281 **Overseer of Weaving.** Englishman; age 36; married. At present employed in good mill. Would like a position paying more than $3.00. Experience on fine ginghams, plain and fancy cotton and worsted dress goods.

1247 **Elastic** weaver wants position as overseer. Used to cotton web, elastic suspenders, silk neckwear, dress goods and handkerchiefs. 28.

1261 **Weaver.** Cotton, woolen, ramie and silk goods. Good experience in first-class mills.

FINISHERS.

1214 **Woolen and Worsted Finisher.** A first class man. One that has had a thorough experience in one of the best mills in New England.

228 **Worsted or Woolen Finisher.** One of the best men in the country. Age 36; married. English. Has had charge of the leading mills in this country. His experience covers woolen and worsted men's wear, also ladies' dress goods, overcoatings, cloaking, etc. Understands the new German finish applicable for dress goods up to eight ounces. By stiffening on the back this finish makes single warp filling goods equal to two-ply.

1322 **Woolen Finisher.** Over 15 years' experience in Canadian and American mills as finisher. Almost all kinds of woolen goods. At present employed but wants position paying $3 per day, or more. Age 33. Married. An unusually skilful finisher.

1041 **Woolen Finisher.** Has had experience on fancy and piece dyed goods, cassmeretes, cheviots, worsteds, kerseys and dress goods. Wants position as overseer or second hand in New England States. Age 26 years. Will work for $2.50 per day.

1330 **Expert Finisher** with 10 years' experience in European mills. Can do perfect work on highest grade cassimeres, serges, cheviots, kerseys, worsteds, astrachans. Age 34; married. German, speaks English imperfectly.

DYERS.

1302 **Young Dyer** wants position as second-hand or overseer in small mill. Has been under good men in well-known mills.

1303 **Dyer** with six years' training in Bradford, England, before coming to this country. Has been in several American and Canadian mills and given best satisfaction. A thoroughly practical and up-to-date dyer. Age 32. At present employed, and would accept only first-class position.

1304 **Wool Dyer.** 16 years' experience, largely in New England mills, and now employed in the South, desires a position in New England mill. American; married. Thorough knowledge of raw wool and shoddy dyeing in acids, fast alizarine colors; also raw cotton in blacks, browns and blues.

1298 **Wool Dyer.** Young man with experience in New England mills on piece dyes, wool, shoddy and rags. Is now out of a position, and will accept a position anywhere except in the South and Canada.

1292 **Woolen Dyer** with experience also in mixes, piece dyes, rags, hosiery, black cotton, waste and shoddy. Has held boss job several years. Age 34; married. Very good references.

1327 **Skillful Dyer** with experience on raw cotton and wool, indigo blue vats, slubbing, worsted and woolen yarn, piece dyeing on ladies' dress goods and men's suitings. Age 45; married. First class references from good mills.

1319 **Boss Dyer.** Wool, cotton, or raw stock. Alizarine colors; shoddy, carpet yarns, straw goods, beavers. Blue-blacks, all kinds of fancy dyeing. Belgian. Age 29. A thorough master of his trade.

1323 **Dyer** of large experience on cotton chain and skein work. Age 40; married. At present employed, but wants higher wages. References from good mills.

KNITTERS.

1257 Superintendent of knitting mill wants position; is a finisher and understands every part of the business, including shipping all kinds of goods, fabrics, cotton, worsteds, silks, wool on all kinds of shapes, and flat goods; most all kinds of knitting machinery and finishing machinery; age 32; married; refers to past record.

1274 A man who thoroughly understands the manufacture of hosiery from the fleece to the case, and is a good manager. Desires to correspond with parties wishing to employ such a man.

1310 **Foreman** with large experience in circular rib knitting. Has worked on almost all kinds of machinery. Is at present out of work, because of mill going out of business. Age 25. Excellent references.

1317 **Knitting Overseer.** Wide experience. Age 36. Not married. Has worked on fleece lined underwear, eider downs, stockinet, jerseys, etc. Familiar with spring needle circular machines First class references.

1274 **Hosiery** superintendent wants position; married. Long experience on men's, women's and children's woolen hosiery.

1294 **Knitter or Machinist.** Understands seamless hosiery and latch-needle machines; ribbed hosiery and underwear. Young man; good references.

1224 **Knit.** Superintendent. Understands all makes of machines; silk, wool, merino, worsted, lisle and cotton goods. References all right. Age 35 years.

DESIGNERS.

1275 **Designer** or assistant. Age 25; married. A good man on cotton or worsted fancy dress goods. Jacquard and box looms.

1263 **Assistant** Designer or Assistant Superintendent. Has received a practical mill experience, and is a graduate of the Philadelphia Textile School. Unions, cassimeres, suiting, cloakings. Age 24 years.

1252 **Designer, Weaver or Dresser.** Aged 40 years; married. Familiar with nearly all kinds of men's wear, piece dyes, etc. Refers to past and present employers.

Account Wanted. Gentleman regularly visiting the cloak, clothing and shirt trade in New York, desires to represent some good mill. Best references. Address P 156, care TEXTILE WORLD.

1326 **Graduate Phila. Textile School** wants position as assistant superintendent or designer in cotton mill. Has also had 3 years' practical experience in mill. Very highest references.

1329 **Accountant or Secretary** thoroughly competent to assume full charge of any set of private, partnership or corporation books. Would take small amount of stock in Southern cotton mill and act as secretary and accountant. Temperate, energetic, excellent references. Age 30; married.

9999 **Superintendent Print Works.** Young man, 30 years of age, energetic and practical, graduate chemist, with thorough experience in printing, especially of silk (2 years in Europe and 4 in this country), seeks position as superintendent or assistant in print works. Address Chemist, care TEXTILE WORLD.

MISCELLANEOUS.

1300 **Wool Sorter** with experience in first-class English mill. Thorough knowledge of wool, noils, waste and all kinds of garnetting. Has not been employed in this country, but can give American references as to character.

1301 **Book-keeper and Paymaster.** Young man of the very highest character desires to move away from the Atlantic coast, on account of his health. Best references from his present and former employers.

1283 **Laboratory Chemist** with experience in large mills and supply house desires position. A moderate salary.

1293 **Bookkeeper** with 22 years' experience in woolen and worsted mills; excellent references. Age 50. Wants permanent position with moderate salary.

1336 **Beaming and Slashing.** Experience in Mass. and Me. cotton mills on ginghams, dress goods and all kinds colored goods. Age 30; habits first-class, good references. At present employed in large mill.

1335 **Loom Fixer or Second Hand.** Knowles and Crompton looms, fancy worsteds and cassimeres, dress goods. German; Protestant; age 37, married. Has been employed in good mills and is very well recommended.

1295 **Reliable Second Hand** who has been loom fixer and second hand in good mills in N. E. Well recommended Age 40; married. Can come on week's notice.

Superintendent of Hosiery Mill. 18 years' experience. Capable of taking entire control of every department in a large mill; just the man for new plant; will go anywhere; South preferred. Age 38. Address B. L. care TEXTILE WORLD.

1312 **Overseer Dresser.** Age 34. Married. Is at present working in a first class mill. Desires to change because of poor health of family. Can furnish first class references. Cassimeres, unions, woolens.

1137 **A Salesman for an Underwear** Mill. Would prefer the account of some large underwear mill exclusively. Salary or commission. Is an experienced salesman and with 9 years practice in the manufacture of knit underwear.

1153 **Comber.** Understands repairing and running combers, speeders and cards. Overseer seven years in one of England's fine mills, on counts ranging from 120s to 150s. Will accept a position as overseer or 2d hand. Refers to responsible parties as to ability and character.

1202 **Silk Superintendent** is open for an engagement with a first-class company. Has a thorough knowledge of all the details connected with the manufacturing of silk ribbons and hat bands, from throwing to the finished product. Has held the position of superintendent of a first-class mill for several years. Under 30 years of age, and married. Has the best of references. For any further information address this paper.

1229 **Dresser.** Overseer of woolen dressing. Age 30. Men's wear and dress goods. Good references.

1228 **Shearer.** Wants position as overseer of shearing. Good man on cassimeres, worsteds, unions and cheviots. Age 25; married. References.

Textile Books.

The following are recent publications, which we will furnish upon receipt of their price:

Wool Dyeing, by William Gardiner, 8vo., 91 pages, fully illustrated.

This is an attempt to deal with wool dyeing in a scientific manner, explaining the theories which underlie the different operations. Prominence is given to the practical side, and working details of all important processes are attached. Among the subjects treated may be mentioned the following: Wool Scouring; Bleaching Wool; Character and Impurities of Water; Mordants; Assistants, and other Chemicals. Price $2.

The Student's Hand-book of Practical Fabric Structure, by H. Neville. 8vo., 235 pages.

The object of this work is to interest the student in the subject of weaving by a series of consecutive lessons in the principles of fabric structure. Free use is made of sectional diagrams, to show what actually takes place in producing any particular fabric. An idea may be had of the nature of the book from the following partial enumeration of the subjects treated: Design Paper and its Uses; Plain Cloth and its Ornamentation; Twilling; Drafts and Tie-ups; Spotting; Open-work Effects; Cords; Pile Weaving; Cross Weaving; and Backed and Double Cloth. Price $2.25.

Plain Series of Cotton Spinning Calculations, by William H. Cook. 91 pages.

This book gives original calculations relating to cotton spinning, giving the position of the different pulleys and wheels, which are taken into consideration when making calculations; and also points where the necessary changes are made when altering from one count to another. Price $1.

The Printing of Textile Fabrics, by C. F. Seymour Rothwell. 8vo., 312 pages.

This is a practical manual on the printing of cotton, wool, silk, and half-silk fabrics, with plates, illustrations in the text, and specimens of printed fabrics. The work contains but little information of a purely chemical or theoretical character, as it has been covered by the "Manual of Dyeing," by Knecht, and others. The author has confined himself more to the practical side of the subject, and the processes and machinery described by him are principally those with which he has had practical experience. It takes up subjects like the following: Machinery Used in Textile Printing; Thickeners and Mordants; The Printing of Cotton Goods; The Steam Style; Padding Style; Resist and Discharge Style; The Printing of Compound Colorings; The Printing of Woolen and Silk Goods. Price $6.50.

Cotton Spinning, by W. S. Taggart.

Two volumes of this work have been issued; the second volume brings cotton spinning down to the end of what is generally termed the preparing processes and includes all of the machinery and manipulations between the card and the self-actor, or ring frame. This work is esteemed of much assistance to the student. Price $1.75.

Ornamental Design for Woven Fabrics, by Stephenson & Suddards. 273 pages, 66 illustrations.

This is a text book dealing with ornamental design for woven fabrics, for the use of the student, and has been written for the purpose of suggesting helpful ideas to designers and manufacturers of textiles, and aims at bringing artistic textile work into practical touch and closer relationship with the technical requirements of manufacturing. It takes up such subjects as Geometric Design; How to Plan an All-over Repeating Design; The Drop Pattern; The Sateen Arrangements; Borders, Corners, Stripes; The Structure of Ornamental Flowers Foliage, Etc. Price $2.50.

Sizing Ingredients. Size Mixing and Sizing, by Hugh Monie, Jr. 63 pages. Illustrated.

This is intended to be a complete practical work, dealing with everything relating to the modern processes of sizing. It takes up such subjects as Sizing Ingredients (flours, softeners, deliquescent substances); Size Preparations (chloride of zinc, whitening materials, percentage of size, etc.); Fermentation; Mixing; Construction of Slasher Sizing Machine; Working of the Machine; etc. Price $1.

Machinery Wanted.

New or second hand; three 4½ inch, 8 needle sleevers, one buttonhole machine complete, one napping machine, in good order.

HANSON-CRAWLEY CO., Barnesville, Ga.

Bonus.

A large bonus in money is offered by the "Board of Trade," of Fort Covington, Franklin County, N. Y., to a manufacturing company who will locate in our town. For full particulars, address

W. G. CUSHMAN, Sec. and Treas., Board of Trade, Fort Covington, Franklin County, New York.

Cotton Mill For Rent.

A large and commodious building; three miles from Wilmington, Delaware. Railroad within two hundred yards. Water power suppiemented by steam. In excellent order. Building contains line shafting, but no machinery. Could be used for any light manufacturing business.

Occupied by prosperous manufacturers for fifteen years. Correspondence solicited. Address,

E. I. DuPONT de NEMOURS & CO., Wilmington, Del.

Barker Rubs Wanted.

We want to buy two second-hand Barker rubs 48 inch, one 44 inch.

TACOMA WOOLEN MILLS, Tacoma, Wash.

WANTED.

A Gentleman with moderate capital to take an interest in a very desirable Yarn Commission business in New England. Address, "YARNS," care Textile World.

MACHINERY Shafting, Hangers, Pulleys and Couplings. Machinery Steel in all sizes from 6 1-2 inches diameter down to 3 16 inch diameter, cut any length, always in stock. Cold Rolled Rounds, Squares, Flats, Hexagons, Octagons, Hexagons, and all shapes finished to exact sizes. Everything in readiness to be shipped at once. Our goods are without a rival and our prices the lowest of all.

Telephone 314, South Boston.

COMPRESSED STEEL SHAFTING WORKS, South Boston, Mass.

MILL SUPPLY BUSINESS FOR SALE!

An old established Cotton and Woolen Mill Supply business, with very desirable connections and good line of customers, is offered for sale for personal reasons. Located in Massachusetts. Business in good shape; can do $50,000 per year. Address in confidence.

"COLUMBIA," care Textile World.

EDWARD JEFFERSON & BRO.,

Worsted .·. Machinery,

28 Strawberry Street,

PHILADELPHIA, - - PA.

SOLE AGENTS FOR

J. B. Farrar & Sons, Halifax, England,

Buggella Cork Rollers for Spinning and Drawing.

Reed Maker.

A recently immigrated maker of hardened and tempered and tinned double steel wire heads for cotton and woolen looms, who understands all the details of the business, wishes to negotiate with a manufacturer of reeds and harnesses, with the idea of making a business connection. Address

P 159, care Textile World.

Ramie.

An intelligent and practical man, who has worked for a long time in one of the few successful factories in Europe which manufactures ramie into imitation silk, woolen and linen goods, would like to arrange with some manufacturer for the introduction of this industry. He understands all the processes from raw material to the finished goods; is able to spin the yarn up to 100s single.

Also understands how to color a fast aniline black without oxidizing, also how to color perfectly fast paranitraniline red in warps or skeins. Address

"AMERICAN CITIZEN," care Textile World.

Knitting Superintendent Wanted.

Wanted, first class superintendent for knitting mill. One accustomed to making first class goods only need apply, and prefer one who has had experience on fleece lined goods. Address

"P. 2782," care Textile World, Boston.

Payne Winder Wanted.

Second hand, in fair condition. Address CORNELL KNITTING CO., Rondout, N. Y.

FOR SALE, SECOND-HAND MACHINERY.

Double Corliss Engine, cylinder 28x60 in. Single Corliss Engine, cylinder 20x48 in. Single Corliss Engine, cylinder 16x36 in. Single Corliss Engine, cylinder 12x24 in. 30-40 50-80 and 100 H. P. Automatic Engines.

Large stock of Plain Slide Valve Engines, Boilers, Steam Pumps, Feed Water Heaters, Lathes, Planers, Shapers, Drill Presses, Milling Machines, Electric Motors and Dynamos, and Wood-working Machines. Let me know your wants as my stock is constantly changing. Yours respectfully, FRANK TOOMEY, 131 No. 3rd St., Philadelphia.

Traveling Salesman.

Situation wanted by an experienced traveling salesman, who is posted in the underwear and hosiery line, and commands a good trade through Wisconsin, Minnesota, Iowa and Northern Michigan. Can furnish best of references. Age 35. Address, P 158, care Textile World, Boston.

Salesman Wanted.

Wanted: — Experienced salesman for America, in foreign hair, wools and glue stock. Communicate with

EISENBERG & STRUCK, 47 Neue Frederiche Strasse, Berlin, Germany.

Hosiery Mill For Sale or To Let!

A new plant, capacity 100 dozen per day.

Water Power To Let, 400 H. P., with excellent buildings.

W. K. DANA, Westbrook, Maine.

HAIR NETS

are in fashion again. We make them. Greatest variety of leading styles. Quality highest, prices lowest. Orders promptly filled.

JENNINGS LACE WORKS, Park Ave., BROOKLYN, N.Y.

10 CENTS

Stamps will do.

We have purchased from the author, W. S. Kelley, the balance of the edition of his pamphlet on Cotton Preparation and the Standard Yarn Tables. Although published ten years ago, much of the matter is as good as ever and well worth 10 cents, at which price we will close them out.

Table of Contents.

Cotton: Characteristic Features
Illustration of Cotton Fibre
Cotton: Inspection and Selection
Mixing and Opening
Process
Machinery and Power
Twist and Elasticity
Temperature and Humidity
Numbering and Testing
Yarn-testing Apparatus
Explanation of Tables
Standard Strength Tables (Four Qualities)
Standard Table (Good Quality), to Quarter Numbers
Draper's Strength Table
Hyde's Strength Table
Table for Numbering Yarn
Grades and Comparative Prices of Cotton
Convenient Multipliers
Yarn Number—Metric System
Thermometer Notation Rules
Metric System
Metric Equivalents
Cost of Patents

SEND 10c. IN STAMPS

And we will send you a copy postpaid.

GUILD & LORD,

620 ATLANTIC AVENUE, BOSTON, MASS.

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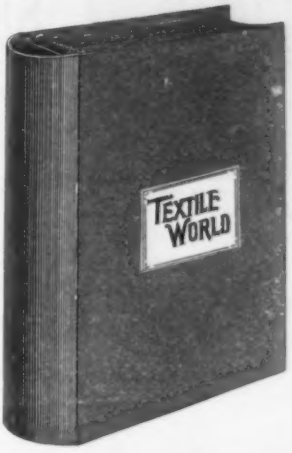

It is the best binder ever invented. It takes only half a minute to insert the magazine, and thereafter it is kept clean, and can always be found when wanted. A single binder will hold **one volume (6 numbers) of the Textile World.** When it is complete it can be filed away in your library as a most valuable book of reference for the year 1896.

As a method of keeping your Worlds for future use, it is worth ten times its cost. It makes all the difference between lost, torn and dirtied copies, scattered about the house or office in such confusion that you can never find what you require, and a handsome, orderly file, which becomes at the end of the year a handsome volume for your library.

A single copy found when wanted repays the cost of the binder twice over. We cannot too strongly urge upon subscribers the great importance of preserving each issue of this magazine in our binder. In a few years you will have an encyclopedia unequalled in character, variety and timeliness. In this way you can in a short time possess a real library without expense to yourself.

The binder has strong cloth covers and the name "Textile World" stamped as shown in illustration. The six numbers make a volume of about 1000 pages.

The Binder will be sent postage paid to any address on receipt of 65 cents. (Stamps will do.)

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To any present subscriber who will get us a new subscription to the TEXTILE WORLD and send $2.00 to pay for the same, we will send the Binder free.

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620 Atlantic Avenue,

BOSTON, MASS.

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Capital Stock, $500,000.

Sanford Spinning Co

FALL RIVER, MASS.

30,000 Spindles. Weekly product, 50,000 pounds 14s to 40s.

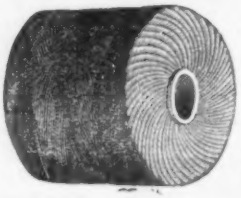
NOVELTY COTTON YARNS,

FROM AMERICAN PEELERS AND EGYPTIAN COTTONS.

OUR SPECIALTY: Superior qualities of Hosiery Yarns, Natural Shades of Cottons, and in Colors, Jaegers, Mixes, and Bleached, Hosiery Cops on Long Tubes, Skeins, Tubes, Cones and Lisle Thread Yarns. Furnished in Carded and Combed Qualities in Singles, 2, 3 and 4-plies.

UNIVERSAL WINDING COMPANY.

YARN MANUFACTURERS will advance their interests



By investigating OUR PROCESS OF WINDING.

HIGHEST AWARD at the World's Fair, Chicago, for new system of winding and also on special machines.

GOLD MEDAL awarded at the Mechanics' Fair Boston, 1895.

In their report the judges say:—"This machine develops an entirely new system of winding, by which threads and twines are prepared in the most compact compass for the market, also shows greater advance in the transfer process than has heretofore been accomplished. This new method of winding subjects the thread to no severe strain, and leaves it in the best condition for use." They also say that they consider the Universal is the greatest single advance shown in any department of our group being *a completed development of a new system*, and thus entitled to the highest award.

F. H. BISHOP, · Manager.

226 Devonshire Street, Boston, Mass.

YARN DEPARTMENT.

Eastern Yarn Market.

Cotton Yarn. Spinners are getting out of orders although prices are firm and will remain so as the combination is living up to agreement and are holding prices for white cop yarn, notwithstanding the prices of cotton. Spinners last season made money and so far as the knitters are concerned, the combination has been a benefit rather than otherwise, because prices have been maintained and knitters are able to go on the market without fear that their competitors have been able to work a lower price out of some spinner. The Southern mills while not in the combination have kept close to combination prices. Southern mills have secured many orders and are giving the trade satisfaction. The Southern mills are selling much 2-ply yarn to weavers for cotton worsteds. Next season the demand for flat goods, heavy weights, is going to be two threaded fabrics using 1-22s to 1-20s. Much yarn will be used in backing in 1-7s. On ribbed underwear the sizes will run very much as heretofore. On heavy weight ribbed underwear, the sizes used will run heavy, and will average 9s to 7s. Next season much colored yarn will be used. At present, mills, many of them, are taking account of stock, and all have orders placed for light weight yarns, orders for heavy weight yarn will not be placed before February and March. Hosiery manufacturers are running very full at present, especially on the cheaper grades. Speaking of hosiery manufacturers, we hear of a knitting machine manufacturer who found it impossible to market his machines in the United States, and sent them to Europe where he has sold many of them and is working hard to meet the English demand at this time. Spinners of fine yarn are busy and the demand for fine combed yarn is very great and especially in the finest numbers, 1-40s and above. We also note a good demand for 2-ply lisle yarn. Spinners are driven hard to fill orders.

7/8 white cops	12¼ cts.
10s " "	13 cts.
12s " "	13½ cts.
14s " "	14 cts.
16s " "	14½ cts.
18s " "	15¼ cts.
20s " "	16 cts.
Silver gray and Jaeger.	
10, 11, 12	15 cts.
14	15½ cts.
16	16 cts.
18	16½ cts.
20	17 cts.
Combed Egyptian, 1/20,	23 cts.
" " 1/30,	29 cts.
" " 1/40,	33½ cts.
" " 1/50,	36 cts.

Worsted Yarn. Spinners are getting out of orders and are ready to take on business for next season. Many manufacturers, believing that after the first of the year yarns will be much higher, are placing orders at this time for deliveries after January. Spinners are out for orders at full prices, and are not inclined to make concessions, as all believe that, in February or March, yarn will be selling at full prices, that is 2-40's at $1.10 per pound. Weavers are getting orders quite freely and there is but little stock on hand, either in the possession of mills or commission houses. The demands of the commission men is for a fabric that can be sold at last year's prices. It matters not what the cloth is made out of so long as the price is reached; and thus it is we find some weavers making worsted cloth out of 18 ounces of cotton yarn and 2 ounces of worsted yarn. Some of the weavers argue that, as the price of heavy weights will reach nearly the standard of future value, the buying will be on the old basis. Merchants as you will remember have been in the custom of buying sample pieces and then taking orders for quantity before placing the same

(Continued on page 147.)

Frank E. Patterson, Prest. — Oscar W. Wood, Treas

Germantown Spinning Co.

COTTON CARDED

HOSIERY YARNS

In numbers from 6s to 26s.

Germantown, Philadelphia.

Glazed, Bleached and Dyed

YARNS

Cone Winding.

W. WARREN THREAD WORKS.

WRITE US WHAT YOU USE, WE WILL DO THE REST.

WESTFIELD, - MASS.

WOOLEN YARNS.

Single, also Double and Twist For Weaving Hosiery.

COVERT CLOTH YARNS A SPECIALTY.

Raw Stock and Piece Dyeing.

CLEAR RIVER MILLS,

PASCOAG, R. I.

(Continued from page 145.)

with the mills. An off set to this, however, is the fact that there are no stocks of heavy weights on the market and buyers are getting tired of being without goods in stock. There can be no doubt that spinners will have a busy season at full prices. Heavy weights will be opened February 15th or later. We note that the engineers' strike in England is even affecting enterprise in the United States. We know of two new combing mills which are equipped, ready to start, with the exception of the combs, and can get no further because the combs ordered are not forthcoming, on account of this strike. The Astrachan trade has not started, but after the first of the year much of this class of fabric will be manufactured, as cloak makers say that it gives good satisfaction to the trade, and has come to stay. We believe that much yarn in 2-14's will be used by the cloaking trade. Some manufacturers in their endeavors to produce a cloth at a given price are trying the use of carpet yarn. The dress goods manufacturers declare that business is worse than it has been for four years. Manufacturers must get higher prices for all classes of cloth on account of the great advance in raw material and buyers are holding off, hoping for lower prices. While this seems to be the condition of the dress goods trade, the overcoating trade has been booming and the deductions to be made are that buyers are waiting until the last moment before operating.

We quote:

2/40s Australian	$1.07½
2/50s "	1.15
2/20s, 3/8s Blood	.60
2/36s, 1/2 "	.75

Woolen Yarn. Spinners are having many inquiries for yarns for next season. In the 2-ply trade orders have been delayed as long as possible on account of the advancing wool market, as the spinners must cover when once an order has been placed. Many spinners have not been in a position to buy large quantities of wool, and have been unable to figure for future busi-

(Continued on page 149.)

CATLIN & CO.,
YARNS.
67 Chauncy St., Boston
216 Church St., New York.
206 Chestnut St., Philadelphia.

SAWYER, MANNING & CO.
YARNS,
86 & 88 Franklin St., NEW YORK

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YARNS.
FINE IMPORTED YARNS A SPECIALTY.
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Cotton, Woolen & Worsted Yarns.
All numbers on Hand and Made to Order.

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MANUFACTURERS OF
WHITE AND COLORED COTTON WARPS
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On Beams, Jack Spools or in Chain
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GRANT YARN CO.,
COMBED AND CARDED COTTON
YARNS 42s and above. AND
FITCHBURG, MASS. WARPS

E. Jenckes Manufacturing Co.
COLORED COTTON YARNS.
Cops and Cones.
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CAPACITY, 50,000 Spindles.

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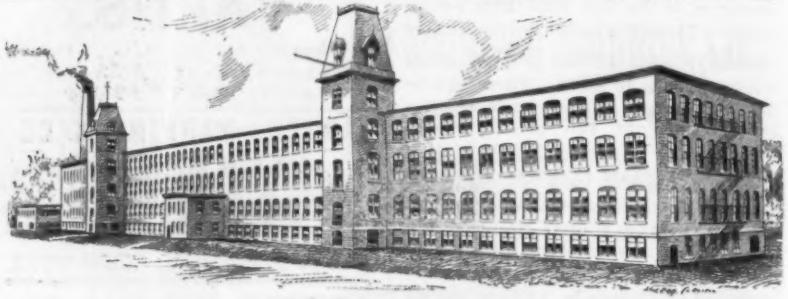

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COTTON YARNS

In Chains and Skeins, on Balls, Beams, Spools—single or twisted.

SILK LUSTRE COTTON YARNS

In single and two or more plys. This yarn retains its lustre through all usages and is increased in strength twenty to forty per cent.

High Grade **COTTON WARPS** and **NOVELTY YARNS.**

Printers of Cotton, Wool and Worsted Yarns.

The J. R. MONTGOMERY CO.,

. . . . . WINDSOR LOCKS, CONN.

Cotton Yarns AND **WARPS** Of Every Description.

James F. White & Co.

COMMISSION MERCHANTS,

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228 Chestnut St., PHILADELPHIA.

BURLAPS all WIDTHS and WEIGHTS.

MONUMENT MILLS,

Manufacturers of

White, Colored, Fancy and Double and Twist,

COTTON WARPS

4s to 60s.

HOUSATONIC, MASS.

PLAIN AND FANCY PATTERN

Cotton Warps,

WHITE, MIXED AND COLORED.

For SATINETS, BLANKETS, ETC.

WHITTIER COTTON MILLS,

LOWELL, MASS.

Continued from page 147.

ness while the more fortunately situated are booking orders at this time for delivery next year. Prices on wool are being firmly maintained. The knitters are not quite ready to place orders for immediate delivery, although 2-ply yarns have been ordered quite freely.

The Philadelphia Yarn Market.

There is very little change in some numbers of yarn, while in others there are considerable changes, notably coarse Southern yarn and single warps. The combination of Eastern hosiery yarn spinners has been remarkably well preserved and their prices have consequently been held firm. This has given good tone to good Southern yarns, and agents generally have worked hard to protect their spinners' interests. There is not much stock accumulating in the market, but some standard numbers in Southern goods have been made ahead of the requirements of the market, and consequently the price has declined. We quote:

WARPS.

20/1	12¼ to 13 cts.
22/1	13 to 13¼ cts.
26/1	13¼ to 14 cts.
12/2	13 to 13¼ cts.
14/2	13¼ to 14 cts.
16/2	14 to 14½ cts.
14/1	12¼ cts.
16/1	12½ to 13 cts.
20/2	16 cts.
30/2	18½ to 19 cts.
30/2 Eastern	19 cts.
40/2 Eastern	23¼ cts.

(Continued on page 151.)

KERR THREAD CO.
—SPINNERS OF—
Fine Combed Sea Island COP SINGLES
All Numbers, 30s to 150s.
Fall River. Mass.

WOOLEN AND MERINO
YARNS. Special line for Bicycle and Golf Goods in all shades
For Hosiery, Gloves, Underwear, and all kinds Knit Goods. Cop, Cone and Skeins.
The J. & H. Clasgens Co.
New Richmond, O

WOOLEN YARNS.
All grades Woolen, Mixed and Merino yarns.
15 SETS CARDS.
EDWARD M. ROCKWELL,
LEOMINSTER. - MASS.

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HERBST & JONES,
Successors to Kershaw Worsted Co.
WORSTED YARN SPINNERS,
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PHILADELPHIA.

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MANUFACTURERS OF
TWINES, THREADS AND YARNS.
Jacquard Harness Twines of all kinds on hand and made to order.
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EICHMANN & STERNBERG
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COTTON WOOL SILK YARNS For Weaving Knitting or Embroidering.
HARNESS TWINES.

AMERICAN SPINNERS' COTTON YARN EXCHANGE
Cotton Yarn Exchange.
COMBED AND CARDED COTTON YARNS
From Northern and Southern Mills.
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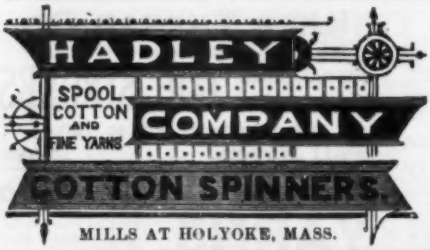
226 Devonshire Street.
BOSTON - - - - MASS.



SPINNERS OF
FINE COTTON YARNS
30s TO 100s.
Gray, Bleached, or Colored. On cop, in skein on spools, cones or tubes.
Fine Cotton Warps, single and two-ply, in chain, etc.
Spool Cotton and Seaming Thread.
95 Milk St., BOSTON.

THE WILLIAM CLARK COMPANY,
WESTERLY, R. I.
Mills equipped with the latest and most improved machinery.
Combed Egyptian from No. 20s to 100s. Combed Sea Island from No. 40s to 200s.
Also 2, 3, 4, 5 ply and 6, 9 and 12 ply cable laid.
Hosiery Yarns on Cops Tubes or in Skeins, Grey, Bleached or Dyed. (Fast Colors.

GREENE & DANIELS MFG. CO.,
COMBED, CARDED AND GASSED
Yarns, Threads, Twines and Chain Warps,
Colored and Bleached Yarns Furnished in any manner desired by the trade. PAWTUCKET, R.I.

GEORGE SHIMER & SON,
Spinners of Worsted Yarn for the Weaving and Knitting Trade.
All kinds of Fancy Yarns for the Knitting Trade.
5th and Erie Sts., Camden, N. J.

YARNS
SOLIS - - BOSTON.
179 Devonshire Street.
ANDREW J. SOLIS, Jr. & CO.

Walcott & Campbell Spinning Co,
IROQUOIS MILLS.
FANCY HOSIERY YARNS
IN ALL COLORS.
New York Mills, Oneida Co., N. Y.

YARNS All Numbers and Qualities.
HOLLAND & WEBB,
478 Broadway, New York.

Eddy & Street,
COTTON, WOOLEN, **YARNS** AND **BRAIDS** WORSTED, SPUN SILK.
PROVIDENCE, R. I.

NEW ENGLAND THREAD CO.
PAWTUCKET, R. I.
Manufacturers of Spool Cotton & Supefine Tapes
Thread and Yarn on Tubes and Cones for the Hosiery trade etc. Thread dressing a specialty, for weaving purposes. Dyers and Bleachers of Threads, Yarns and Tapes.

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(Continued from page 149.)

SKEIN.

26/1	13½ to 14 cts
20/1 soft	13½ cts.
19/1 "	13½ cts.
4s to 10s soft	11½ to 12½ cts.
12/1 soft	13. cts.
20/2	15½ cts.
14/2	12½ cts.
30/2	18 to 18½ cts.
30/2 Eastern	19 cts.
26/2	17 cts.
40/2	23 to 23½ cts.
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16/2	13½ cts.
9/4 slack	11 cts.

SOUTHERN CONES.

6s to 8s (according to quality	12½ to 13½ cts.
10s	13 to 13½ cts.
12s	13½ to 14½ cts.
14s	14½ to 15 cts.
16s	15½ to 16 cts.
20s	16 to 17 cts.
24s	17 to 18 cts.
26s	17 to 18 cts.

SHUTTLE COPS.

6s to 8s	12½ cts.
10s	12½ to 13 cts.
12s	13 to 13½ cts.
16s	13½ to 14 cts.
26s	14 cts.
40s Eastern	18 to 19 cts.

(Continued on page 153.)

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Toweling and Grain Bags.

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(Continued from page 151.)

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14s	15½ to 16 cts.

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10s to 12s hosiery .	14½ to 15 cts.
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16s hosiery . .	15½ to 16 cts.
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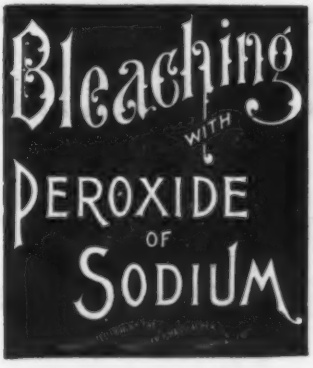

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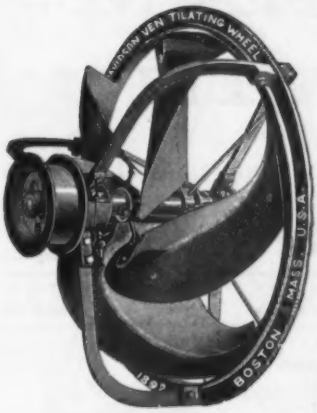

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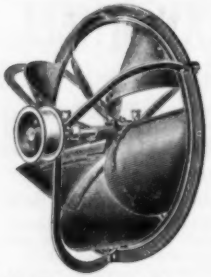

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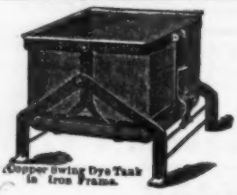

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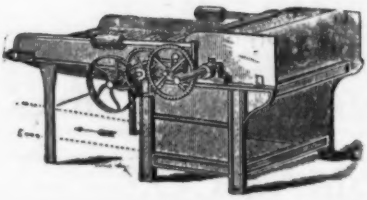

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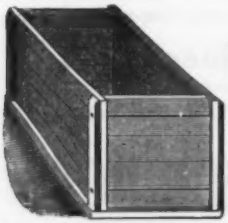

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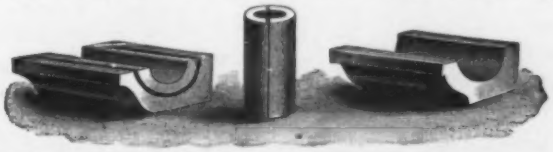

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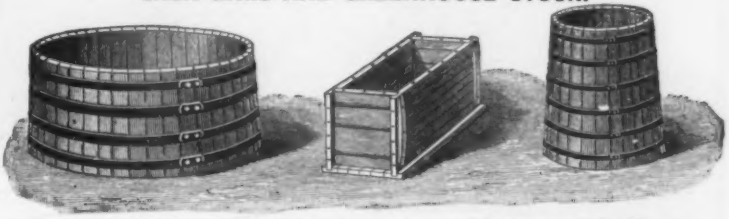

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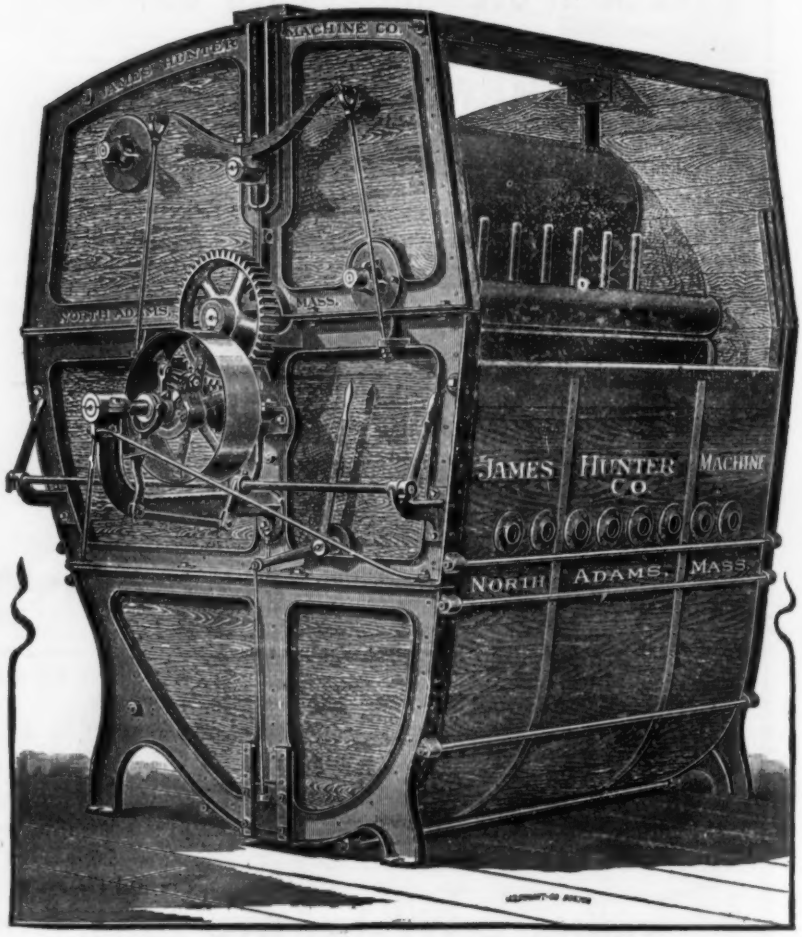

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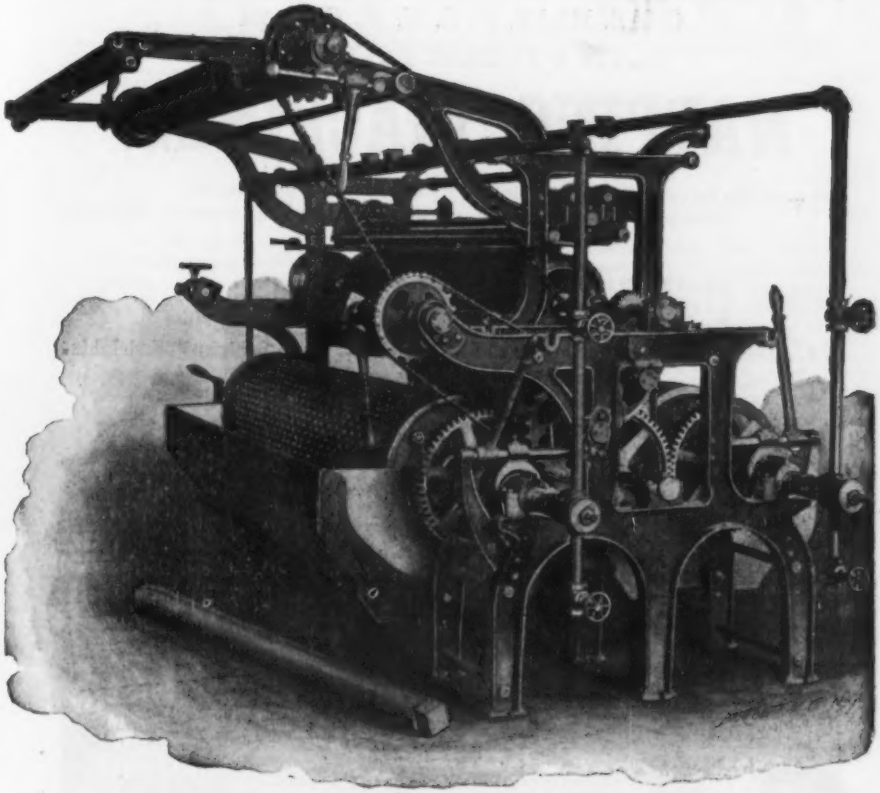

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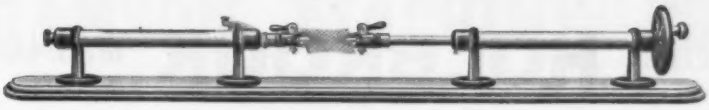

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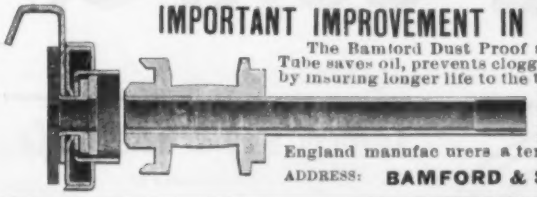

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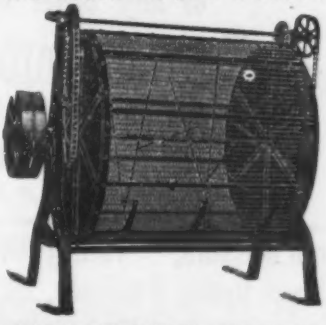

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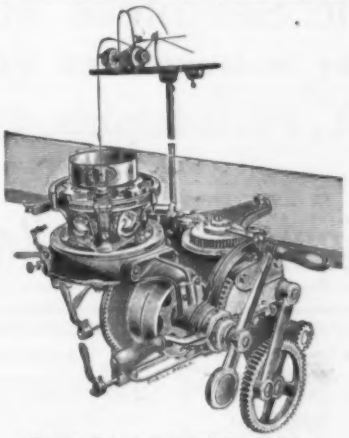

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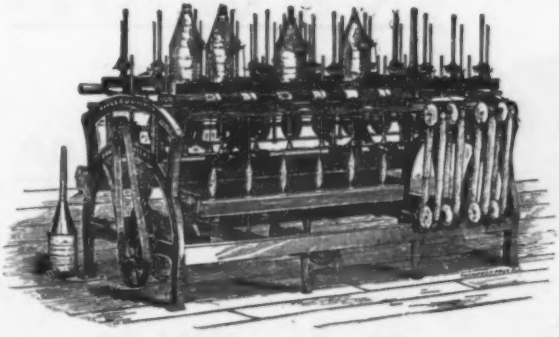

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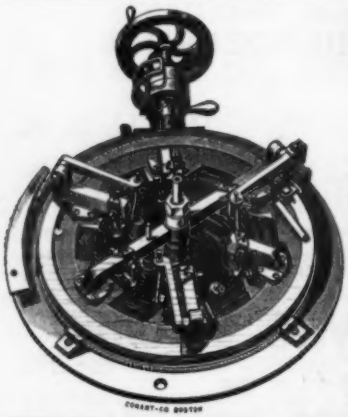

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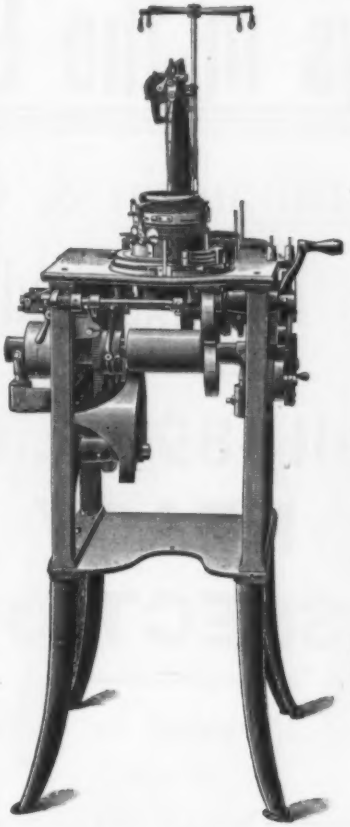

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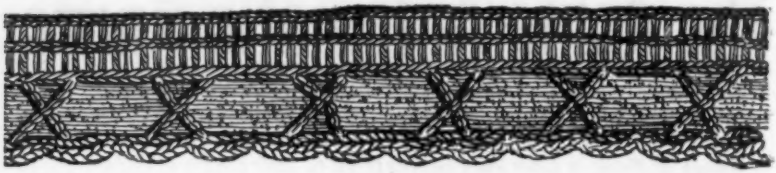

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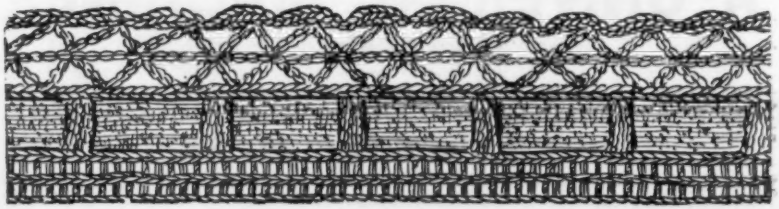

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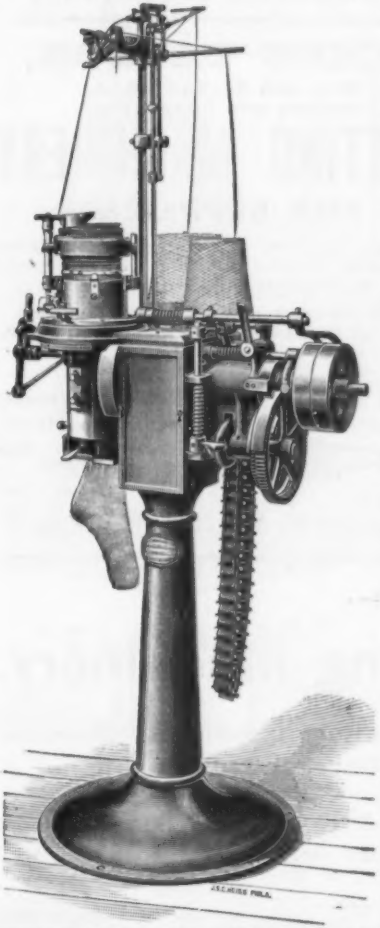

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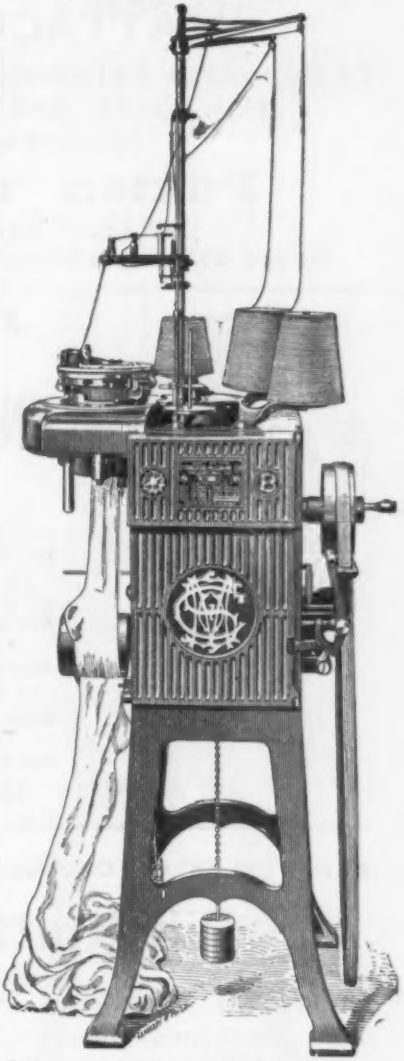

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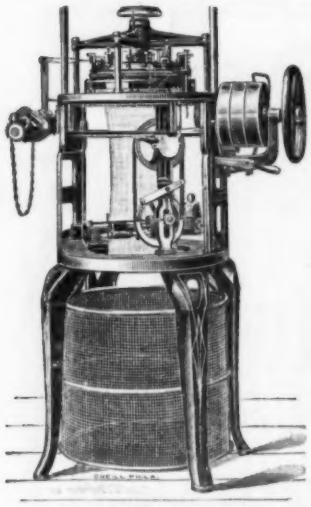

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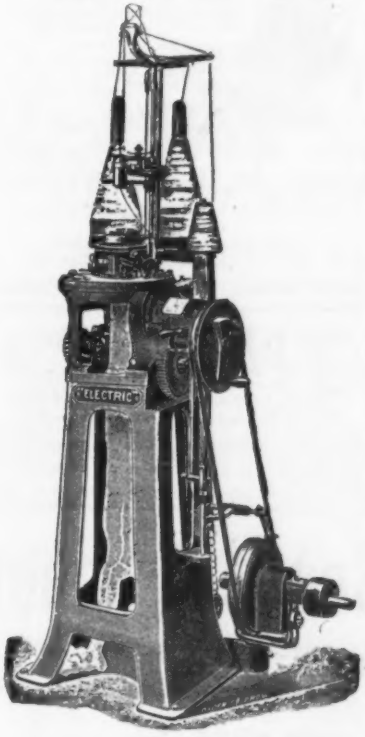

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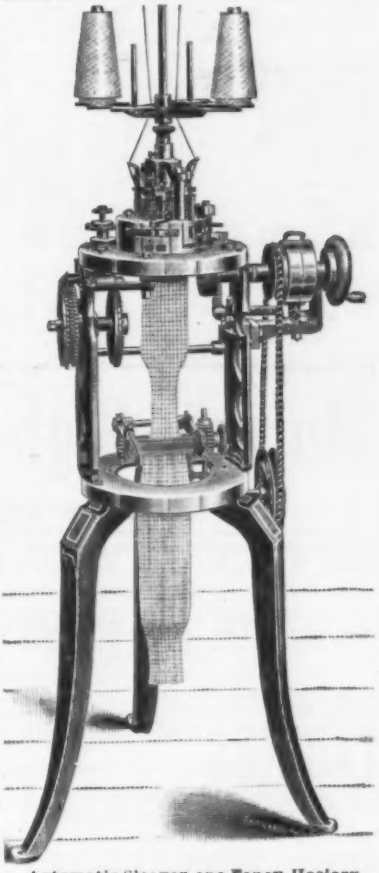

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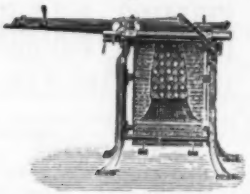

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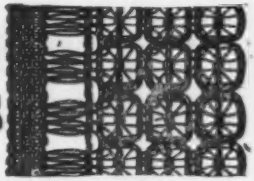

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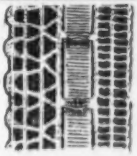

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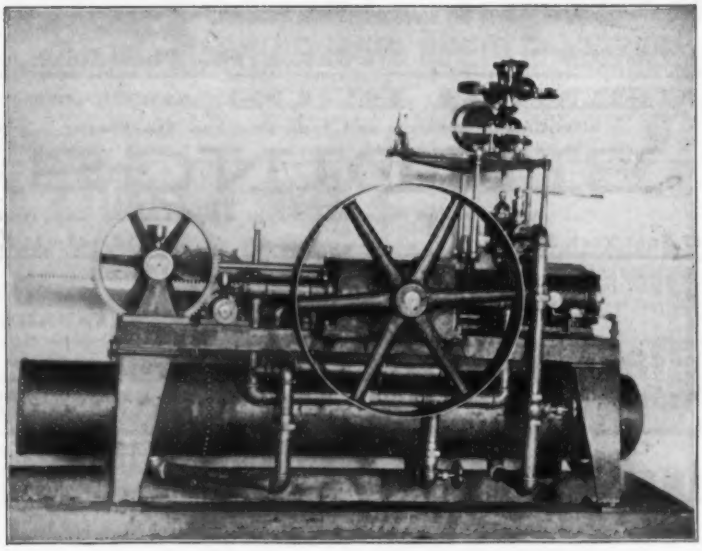

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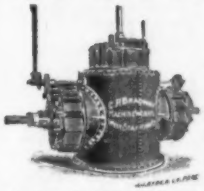

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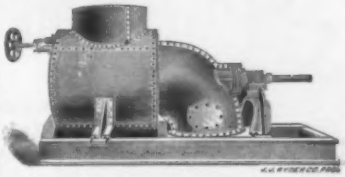

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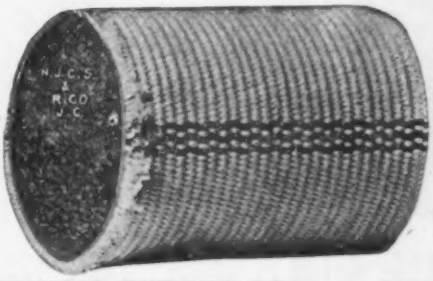

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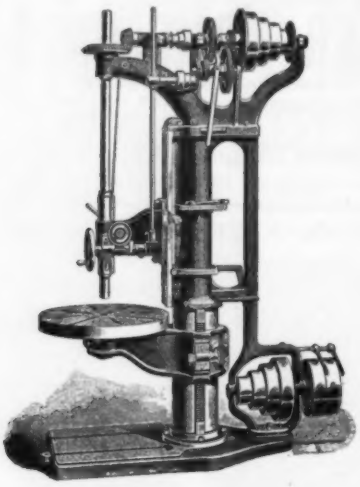

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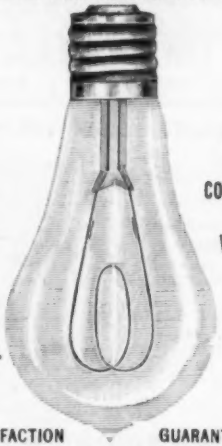

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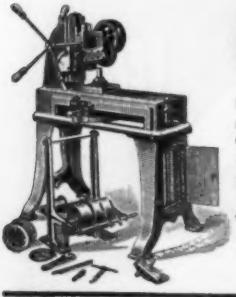

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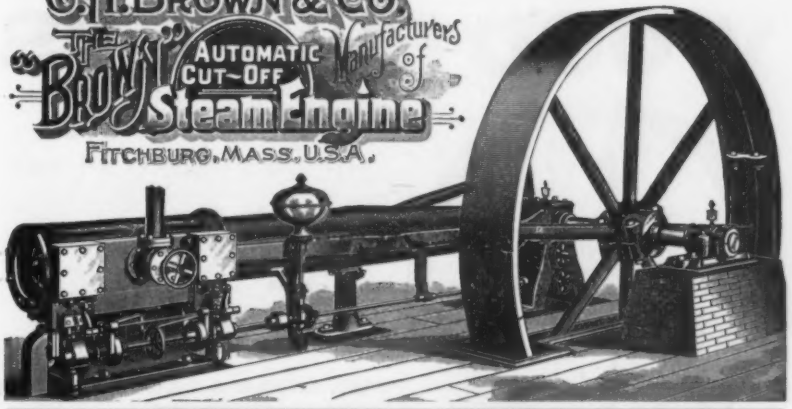

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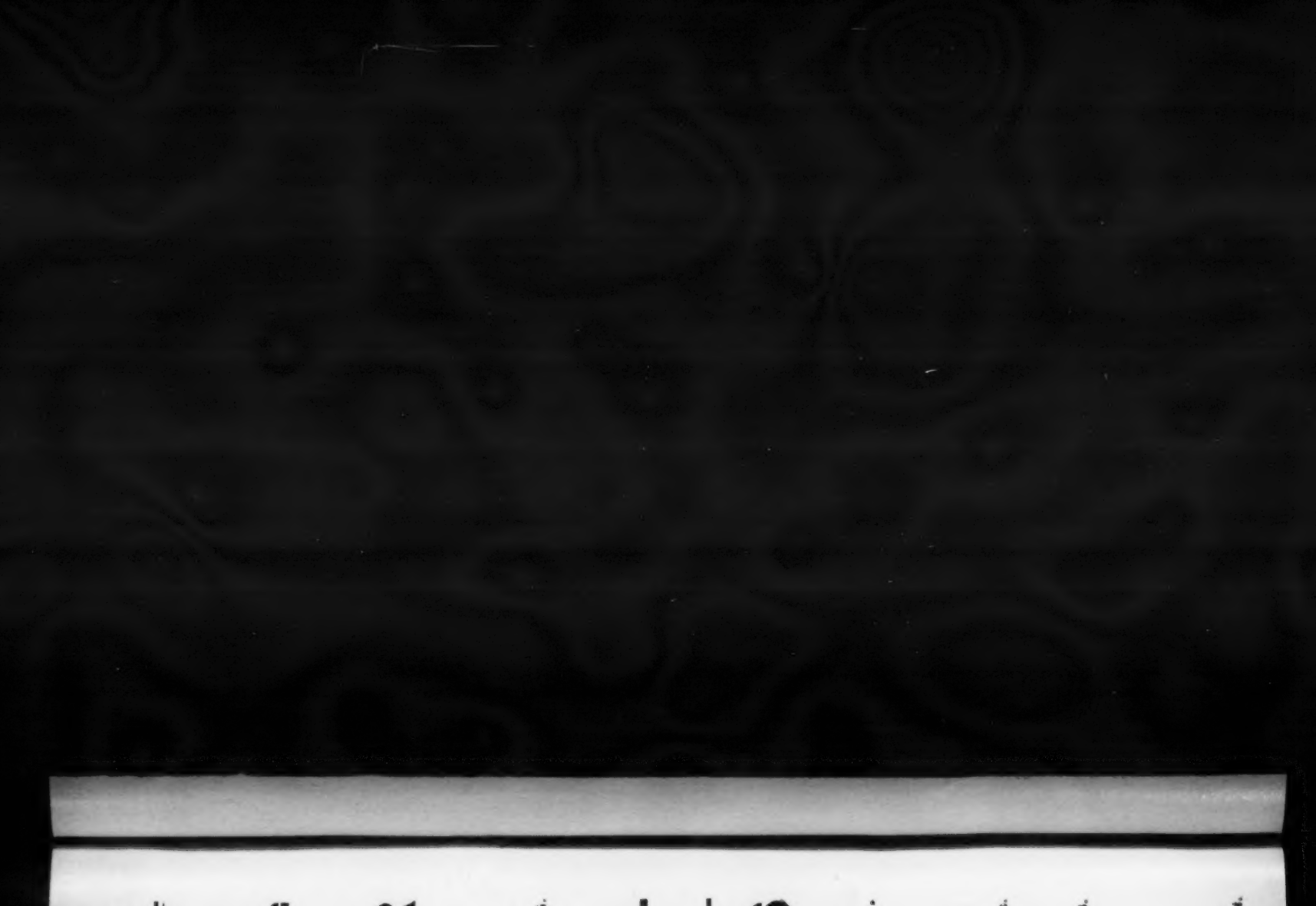

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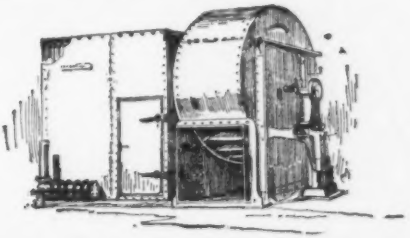

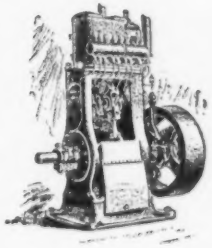

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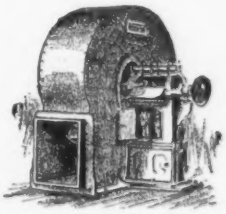

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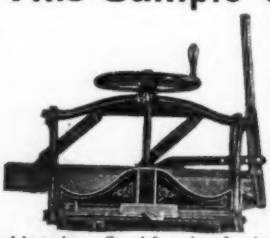
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